MAR 24 1898

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. MARCH 24, 1898. CHICAGO, ILL. NUMBER 12

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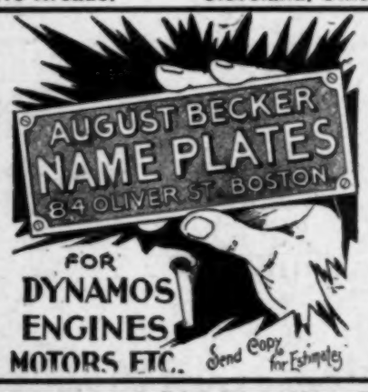

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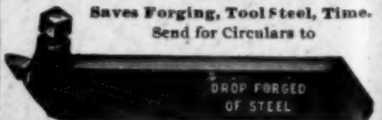

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. MARCH 24, 1898. CHICAGO, ILL. NUMBER 12

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The iron trade goes steadily on its way, with little change in markets. It is not surprising that producers tire of the monotony, even of full operation, with prices at the low level of recent months, and the characteristically American desire for a market with some vim crops up. But all present indications for 1898, leaving out war contingencies, point to tonnage as the chief good to be expected for the iron trade. A few large producers will have a satisfactory aggregate of profits. Two important developments of the week indicate the Western trend of production. The formation of the American Steel & Wire Co. means the grouping of certain Western and Central Western wire interests about the Illinois Steel Co. as a source of supply for billets and rods, and would seem to point to the more complete possession of Western and Central markets by mills nearest to them. The other significant event is the authoritative announcement that arrangements for foreign capital are complete, so that work will begin within a few days on two 500-ton blast furnaces and 240 by-product coke ovens for the Johnson Co. The marvelously low cost of Bessemer pig iron insured to Lorain means a wider market than before for Central Western steel. There is further conference this week of Cleveland, valley and Pittsburg furnacemen producing pig iron for the market. The $10 basis for April, May and June deliveries of Bessemer iron is established. No steps have been taken as yet for the curtailment of production, but the plan of reporting sales to a commissioner is adopted, and in other details there is some resemblance to the organization of Southern producers. The market for Southern iron has settled into quietness of late, but consumption is at a gratifying rate, indicating a general improvement in the foundry trade, which has been slow to catch step with other lines. There has been no serious test of the prices agreed upon by the associated furnaces, but they have held on small lot business. Warrant iron has been more of a factor in preventing the full establishment of the new basis, than the product of the few independent furnaces, and it would appear that some of the lots that were lifted off the market last year at times when such relief was particularly acceptable, are now likely to come back to plague producers when they are attempting to maintain a price with a profit in it. Charcoal irons, following the brisk buying prompted by the low prices on Lake Superior brands, are in demand for war munitions, and in the higher numbers stocks have been quite well taken up. Special steels have been called for, also, by concerns having Government contracts. Pittsburg mills note this week the beginning of spring demand in lines affected by the opening of the season of out-door work. Some foreign rail business has come to Pittsburg mills and foreign requisitions for railroad equipment are coming steadily to Eastern locomotive works. Perhaps the most active of all interests in the past fortnight is the Lake Superior ore trade, and buying to date has aggregated close to 4,000,000 tons by consumers having no mining connections. Wire and wire nails are unaffected by the Western consolidation, and are only fairly active at $1.15 for smooth wire and $1.40 for nails, Central Western mill.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
807 TRADESMEN'S BUILDING, March 23.

Valley furnace interests are in conference again this week, in the endeavor to perfect their selling arrangement. Meanwhile the list of merchant furnaces is further decreased by the Raney & Berger Furnace at New Castle passing into the hands of the Shenango Valley Steel Co. Spring business in finished material is beginning to appear, and in Pittsburg considerable structural work is ready to be placed. The beam interests, at their New York meeting did not alter the 1.15c basis, but extended the price agreement to cover all structural shapes. An inquiry for rails for the Siberian Railway in Russia was received during the week by the local mill, and two orders for Japan were shipped from Pittsburg.

PIG IRON.—Another meeting of valley furnacemen is called for Wednesday and Thursday in Pittsburg to perfect details of the organization formed at Cleveland last week. Bessemer iron, meanwhile, is not offered by furnacemen below $9.75 valley for March and $10 for second quarter—the prices agreed upon. From outside holders iron could be had at lower figures, but there has been little or no inquiry for it. Improvement in foundry business is said to be responsible for the larger buying in foundry grades generally reported here. Prices stay at a low level, nevertheless. Quotations are made as follows:

Bessemer, valley, March	$	9.75
Bessemer, valley, second quarter	9.90 to	10.00
No. 1 Foundry	10.40 to	10.50
No. 2 Foundry	10.00 to	10.15
No. 3 Foundry	9.50 to	9.75
Gray Forge Pittsburg	9.00 to	9.10

BILLETS.—Billets are selling in small quantities at $15 and $15.25, maker's mill, Wheeling, and $15.50, Pittsburg.

SHEET BARS.—Sheet bars are still low. On recent sales $16.75 and $17, delivered, have been accepted, and $17.25 and $17.50, delivered, Pittsburg, are quoted.

RODS.—The wire consolidation is settled, and rods are unchanged at $22.50 and $23.00.

STRUCTURAL MATERIAL.—Beams, by the meeting of the pooled interests of last week are reaffirmed at 1.15c for 3 to 15 inches and 1.25c for 18 to 24 inches. The prices that have been held by agreement on tees, zees and angles, are now more binding by a tonnage allotment similar to what has been in effect on beams. These prices are 1c for angles, 1.15c for zees and 1.20c for tees. Building projects in Pittsburg are opening up earlier than in other territory, and several 400 to 800-ton orders are hanging. The Kaufman and Wellman buildings, 1,000 tons each, have been let. A building for the Consolidated Traction Co., 800 tons; the Union Trust Co. building, 800 tons; the Smith building, 700 tons; a county building at Woodville and a new office building are in different preliminary stages. The general outlook is better in the last few days. Mails are heavier and considerable estimating is being done. Universal plates are still relatively higher. In connection with other shapes they are selling at 1c to 1.05c; alone, 1.10c.

BARS.—Steel bars are quoted at 95c and 1c—the two prices being made at different mills. The business of the last two weeks has not been large enough to provoke lower prices,

and nothing on the 90c basis of ten days ago is heard. Common bar in the valley is quoted at 95c.

PLATES.—Mills quote plates: Tank, Bessemer and open-hearth, 1c; shell, 1.10c; flange, 1.20c; fire-box, 2c.

SPELTER.—Spelter still tends upward. Prime Western is now quoted at $4.22½ and $4.25.

FERRO-MANGANESE.—Domestic ferro-manganese, 80 per cent, is quoted at $47 and $47.50.

SHEETS.—Sheet mills willing to sell into the fall can find orders in abundance, and some of the more timid have been selling well ahead at prices little above those now in force. With the mills generally there is a willingness to wait, and meanwhile 2c for No. 28 is the basis of prices made. Rumored sales at 1.90c and 1.95c are discredited. Galvanized sheets at 80 and 5 and 80 and 7½ per cent off list are unusually active just now.

IRON AND STEEL SKELP.—The skelp demand is heavy enough to cause two local mills to work double turn. Prices continue weak. Grooved steel skelp, 90c to 95c; sheared steel skelp, 1c to 1.05c; grooved iron skelp, 1.05c to 1.10c; sheared iron skelp, 1.12½c to 1.15c, four months f. o. b. buyer's mill, or 2 per cent off for cash.

PIPES AND TUBES.—More gas and oil projects are daily coming to light. The Standard Oil Co. is particularly active, and will place some desirable orders when the season opens up. Prices so far are not higher. Base discounts are as follows: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. The additional discounts are 6 tens and 5 per cent on small lots and 6 tens and 7½ per cent on attractive orders Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off.

RAILS.—The Carnegie Steel Co., Ltd., through its London agency, has received an inquiry during the week for the rails needed on the Siberian Railroad in Russia. Two orders for Japan, one of 3,000 tons of 60-lb. rails for the Nippon Railroad and another of 250 tons of 50-lb. rails for the Nankin Railway, were shipped from Pittsburg last week. Rumors of a break in prices on rails are denied, and $18, Pittsburg, is quoted. On track material we quote as follows: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.20c.

OLD MATERIAL.—A lot of 2,500 tons of billet and bloom crop ends was sold during the week to a local mill at $11.25. Iron rails dropped slightly, while 500 tons of steel rails sold at $11. A similar lot of iron rails sold for $13.75. Five hundred tons of railroad cast scrap sold for $9.50, gross; 250 tons of car-wheels, $10.50, gross, and 150 tons of No. 1 wrought scrap at $11.75, net. Other prices are: Coil spring, $11.25; wrought turnings, net, $7.75; heavy melting stock, $10.50; cast borings, $6.25; heavy busheling scrap, $9.75; crop ends, billets and blooms, run of mill, $11.

CLEVELAND.

OFFICE OF *The Iron Trade Review, and Industrial World.*
27 VINCENT ST., March 23.

Iron ore buying has gone on steadily in the past week, following the round lots aggregating about 1¼ million tons, placed by the Illinois Steel Co. Under the regime of definite prices, with guaranteed analysis on association ores, the procedure is simplified for both buyer and seller. With the former it is simply a question of selection, in the case of old-range Bessemer ores, and the old-time maneuvering for position and see-sawing over prices is eliminated. Furnacemen have been taking up the most desirable Bessemer ores, and as was the case early in last season's buying, several of these have been spoken for close up to the estimated production for 1898. Non-Bessemer ores have been bought in fair quantities on the basis of $2.10 to $2.15 for some of the higher phosphorus foundry ores of the Menominee range, while Marquette range non-Bessemers are from $2.10 and a shade lower to $2.40, according to analysis. The Mesabi situation is not well developed yet. The agitation for lower rail freights for producers having no railroad interests is heard of again, but it is not expected that Mesabi rates this year will be lower than in 1897. Furnace interests are not in a hurry to buy Mesabi ores, arguing that the supply is ample and that competition may be keener later on. Little chartering is announced beyond the large blocks recently announced at 65 cents and 60 cents from the head of the lake, and 60 cents from Marquette. While several hundred thousand tons were placed at 60 cents for the season from Duluth, it is questionable if that rate can be established, in view of the fact that the supply of boats which can live at 60 cents, the season through, is far from enough to reach around.

PIG IRON.—The perfection of association arrangements among valley furnaces making Bessemer iron for the market seems to insure the holding of $9.75 for spot Bessemer and $10 for second quarter iron, valley furnace. One sale of 10,000 tons at the latter figure is reported. Generally, the market is quiet. There is some satisfaction to merchant furnacemen in the fact that the addition to the blast furnace capacity of steel works in the Shenango Valley, like that at Pittsburg recently, at the same time decreases the number of merchant furnaces. The Lorain plans, moreover, will still leave that interest a large buyer of pig iron. Foundries are running quite full, but there is a slight lull in buying of foundry iron. Valley quotations remain at $9.25 to $9.50 at furnace for No. 2. Forge is slightly firmer, and is quoted $8.75 at furnace. Lake Superi. or charcoal iron is higher. Eastern works manufacturing shells have been buyers recently. We quote f. o. b., Cleveland:

Bessemer, second quarter	$10 65	Valley Scotch No 1	$10 40@10 65
No. 1 Strong Foundry	10 40@10 65	Valley Scotch No. 2	10 15@10 25
No. 2 Strong Foundry	9 90@10 15	Gray Forge	9 15
No. 3 Foundry	9 40@ 9 65	Lake Superior Charcoal	11 50

FINISHED MATERIAL.—Mills in the valleys and in Cleveland are still well occupied, but March business has been for the most part in small lots. The past week has been quiet in respect to construction material, though some down-town work is in prospect. The contract for the eight-track draw for the Chicago Drainage Canal, which it was expected would come to Cleveland, is off, other plans having been adopted. Bar iron is unchanged at 90c to 95c, valley, with competition exceedingly keen. Steel bars are sold at 1c, delivered, Cleveland. We quote beams and channels, 1.15c, Pittsburg; tank plates, 1c to 1.05c, Pittsburg; angles 1c. Old material is on the basis of the past few weeks—$11.50 for No. 1 railroad wrought; $13.50 for old iron rails, and $10 to $10.25 for old steel rails.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1142 MONADNOCK BLOCK, March 23.

The wire combination, on a smaller scale than at first contemplated, has been completed, as noted elsewhere. It is not expected that this will have any effect upon the market one way or the other. The combination will probably take a large part, if not all, of the wire rod output of the Illinois Steel Co., insuring that company sales of so much of its total production. The market generally has been quiet, with comparatively small sales in all branches. The mills and furnaces are to a large extent full of orders for a long time into the future, and are not pushing business at present. Prices on a good many products appear to have stiffened materially, although no advances in quotations have been made, but with a continuance of the large consumption of iron and steel, there is almost no doubt that prices will advance. The railroads continue to be good buyers of material, and figures are being made this week on about 3,000 cars for various systems.

PIG IRON.—The largest sale of the week was one of 1,000 tons of Southern iron. Only one or two sales of any size were made, either of Southern or Northern iron, and the total for the week was probably not as large as was that of the week previous. The demand has fallen off somewhat, as buyers appear to have satisfied their requirements for some time into the future, and it is expected that there will be comparatively little buying for the next few weeks. Prices are unchanged, and the market is firm. The Southern furnaces out of the combination are more nearly maintaining the association prices than they were a week ago, and have made sales recently at full quotations.

Lake Sup. Charcoal	$12 00@12 50	South'n Coke No. 1	$10 10@10 35
Local Coke Fdy. No. 1	11 50@12 00	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	11 00@11 50	Southern No. 2 Soft	10 35@10 60
Local Coke Fdy. No. 3	10 75@11 00	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 75@11 00	Alabama Car Wheel	14 00@16 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 35@10 60	Coke Bessemer	11 50@12 00

BARS.—Sales last week were not large, and were in small lots, apart from one or two contracts of considerable tonnage wer placed. Numerous car specifications are on the market, and these are expected to be placed soon. Prices are unchanged from last week, but the market is rather firmer, particularly those on steel. Quotations are made at 1c to 1.05c for common iron, 1.10c to 1.15c for guaranteed, and 1.10c to 1.15c for soft steel bars from strictly billet stock.

CAR ORDERS.—No large contracts were placed last week. Several for small lots of cars were given out, and bids are being taken this week on over 3,000 cars for various systems. The Great Northern is asking prices on 1,000, the Northern Pacific on 500, and the Toledo & Ohio Central on 800 cars.

RAILS AND TRACK SUPPLIES.—The local mills are full of orders to the last of the year on heavy sections, and are taking very little business. Light sections are in good demand, and some sales were made last week. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.60c to 1.65c.

BILLETS AND RODS.—Very little business was placed last week, either in billets or rods. Prices are unchanged at $17.50 for billets and $25 for rods.

STRUCTURAL MATERIAL.—The George A. Fuller Co., of Chicago, has recently taken contracts for large buildings in New York, Boston, Pittsburg and St. Louis, and the orders for the steel required have been taken by the Chicago office of the Carnegie Steel Co. General business in small lots was good last week, and seems likely to continue so for some time. The mrketa is inclined to be a little firmer on some shapes. Quotations are made as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.15c to 1.25c; plates, 1.10c to 1.15c; tees, 1.35c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—Considerable orders for plates were placed last week, and a continuance of the demand is expected. The local mills have orders for a considerable tonnage of ship plates, and further business, amounting to about 3,000 tons, is expected to materialize soon. Prices are not very strong, but are unchanged. They are as follows: Tank steel, 1.10c to 1.15c; flange steel, 1.40c to 1.45c; fire box steel, 1.85c to 5c.

MERCHANT STEEL.—Business has been good, and included several large contracts for future delivery. The demand appears to be increasing steadily. Prices follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SHEETS.—Good sales were made last week, and the inquiries in hand denote a continuance of the business. Orders from both mill and store were good. Quotations are made at 2.05c to 2.15c for No. 27 black, and 80 and 7½ to 80 and 5 per cent discount for galvanized.

SCRAP.—Little business has been done in this branch of the market, and there is only a light demand for scrap of any kind. Some sales of rails were made, but prices were not obtainable. We give dealers' quotations:

Old iron rails, gross,	$12 50@$13 00	Axles, net	$14 25@14 75
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 25@ 9 50	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	11 00@ 11 50	Axle turnings, net	7 25@ 7 50
Railroad forge, net	12 00@ 12 50	Mixed steel, gross	7 25@ 7 50
Dealer's forge, net	10 50@ 11 00	Stove plates, net	6 00@ 6 25
No. 1 mill, net	7 50@ 8 00	Heavy melting steel, gr.	8 25@ 8 50
Heavy cast, net	8 50@ 9 00	Old iron splice b., net.	13 25@ 13 50
Malleable cast, net	8 00@ 8 50		

CINCINNATI.

March 22.

A very quiet week for Southern iron has just passed. The trading has been in small lots and generally full prices have been realized. A shortage on soft irons is indicated by Southern furnaces. There has scarcely been no fair test of the new prices as yet. An Indiana car company was in the market for 6,000 tons of lower grades a few days ago. About 2,000 tons went to a Kentucky furnace that is not committed to the price agreement; the balance was generally bid on, the offers including some speculative iron at cut prices. Association furnaces are selling small amounts of No. 2 at $7.25 Birmingham, but one or two outside furnaces are quoting $7. The most active interests at present are the malleable iron foundries, though the Central West shows a slight expansion of the foundry business in all its departments. Metal is taken freely on contracts, yet the current make is probably slightly in excess of consumption. We quote f. o. b., Cincinnati. Southern coke, No. 1 foundry, $9.75; No. 2, $9.50; No. 3, $9.25; gray forge, $8.75; mottled, $8.75; No. 1 soft, $9.75 to $10; No. 2, $9.50 to $9.75; Belfont coke, No. 1, Lake Superior, $11 to 11.50; Belfont coke, No. 2, Lake Superior, $10.50 to $10.75; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15.

PHILADELPHIA.

March 22.

Gauged by new business, the situation in iron gives little evidence of strength, but current consumption as indicated by shipping orders continues at the highest point. The run of business is in small lots, with now and then a good order. Government requirements for war munitions have resulted in some activity in the higher numbers of charcoal irons, and more business of this sort is pending. Stocks on high grades have been pretty well taken up, and the tendency in all charcoal irons is upward. Pennsylvania furnaces are quoting Philadelphia deliveries as follows: No. 1X foundry, $11.75; No. 2X foundry, $10.75 to $11.25; No. 2 plain, $10.25 to $10.50; standard mill irons, $10 to $10.25; Lake Superior charcoal, $13 to $13.25. Little is done in billets and the market is nominally $17.50. Mills find no slacking of work, but the business is made up of a multitude of well distributed orders. The war preparations which have given good orders to certain producers working in appropriate special lines have given a slight stimulus to other interests. Repair work of all kinds and the enlarged facilities provided for plants engaged on Government contracts have added something to the general foundry trade. Structural mills have been busy for the most part of late, on orders booked before the association prices went into effect. The outlook for new work in these lines is good, though war talk is thought to be holding back some enterprises. Bar mills have a slightly better outlook than in the past few weeks. We quote common iron at 1.05c to 1.10c; refined bars, 1.12½c to 1.15c; steel bars, 1.10c to 1.15c; plates and angles, 1.15c; beams and channels, up to 15 inches, 1.30c.

Beam Pool Meeting.

The six interests included in the beam agreement met at the Hotel Waldorf, New York, Wednesday, March 16, for the first conference since the formation of the pool. The most important action was the move to include in the price agreement now in force on beams and channels all other structural material excepting plates, which owing to the number of outside mills could not be easily controlled. A maximum tonnage on tees, zees and angles is now allotted each mill, and reports of each month's output must be made to Commissioner Bailey, as is now done on beams. The Pittsburg prices fixed were those nominally ruling since Jan. 1: Tees, 1.20c, zees, 1.15c; angles, 1c. Beams were reaffirmed at 1.15c for 3 to 15-inch sizes and 1.25c from 18 to 24 inches.

The question of prices in territory having variable freight rates—particularly the far West—was adjusted by arranging for a schedule of delivered prices, giving the mills equal advantages. This will probably be completed in the present week.

ALL the finishing mills at the Star Iron & Steel Works of Lindsay & McCutcheon, Allegheny, are running double turn. Something over 1,100 bundles of cotton ties a day are being turned out and shipped in model barges by river to Southern points.

RAPID progress is being made in the erection of the new plant of the Old Meadow Rolling Mill Co., at Scottdale, Pa. It is now expected to begin operations about July 1.

THE new open-hearth mill No. 3 at the Homestead Steel Works is nearing completion and will be put in operation in three or four weeks.

THE IRON TRADE REVIEW

AND

INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

MARCH 24, 1898.

PUBLISHERS' ANNOUNCEMENT.

With the present issue *The Iron Trade Review* and the *Industrial World* appear as one paper. The merging of the two interests is indicated by the added sub-title "Industrial World," at the head of this column, though the familiar "*The Iron Trade Review*" heading on the first page and other pages will remain unchanged. This consolidation is in line with some tendencies that have been emphasized in industry of late; and in this instance the theory of the movement and its practical outcome will be made to agree. The result will be more valuable service to the customer, whether he be subscriber or advertiser, while the cost of the commodity is not increased.

The record of the *Industrial World* is well known to the constituency which it has served for many years in Chicago and the thriving industrial districts tributary to it. Its standing with the machinery, metal-working and iron and steel interests in that section is evidenced in the steadfastness of its patrons of years—a factor of no small account to a newspaper. Of *The Iron Trade Review* it is proper to say to those of its present readers who are least familiar with its progress in the past few years, that it has had a steady growth, even under the unpropitious times from which industry is emerging. The establishment of editorial and business offices in Chicago five years ago has brought recognition and extension in that important field. The new step means the strengthening of this position, and with an enlarged constituency will come better facilities and a stronger paper. Two years ago editorial and business offices were also established in Pittsburg, and the reception given the paper there has been gratifying.

While the field heretofore covered by the two papers coincided in part, each had a certain constituency which the other did not reach; thus their union insures a considerably larger subscription list than either had and gives the consolidated paper a wider scope.

Performance is better than promise; but it will not be amiss to say that it is the intention to make the consolidated paper steadily progressive and more and more serviceable to the interests it represents.

THE PROPOSED NEW SHIPYARD.

Orders for Ships the Thing Needful.

Among shipbuilders whose opinion upon Mr. Carnegie's recent letter was sought by *The Iron Trade Review* was Henry W. Cramp, vice-president of the Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia. The letter asking Mr. Cramp's views contained the following statement and question: "In spite of the lower prices of steel in this country and the reported higher efficiency of machinery in shipyards here than abroad, Americans who buy ships insist that the foreign vessels are the cheapest. Is this because our cheaper steel and more efficient machinery have not yet overcome the difference in wages between the United States and European countries?"

Mr. Cramp's reply is as follows:

"With regard to the letter of Mr. Andrew Carnegie, relative to the establishment of a shipyard at New York, and the comments made on it by various papers and shipbuilders, to which you call my attention, I remark that from my point of view the question raised by Mr. Carnegie does not seem at this time to demand discussion. So far as I can see the real need of the American shipbuilding industry is not additional shipyards, but additional ships to build. Until this latter requirement shall have been fulfilled or is in a fair way of fulfillment, the discussion of the question of sites or locations of new shipyards will be at least premature. Your concluding question is based upon the assumption that 'foreign built vessels are the cheapest.' Having assumed this, you ask, 'Is this because the cheaper steel and the more efficient machinery have not yet overcome the difference in wages between the United States and European countries? In this you have asked only half and perhaps not the most important half of the real question. The difference in wages as between this country and England is about 100 to 60 in the average against this country, in all branches of shipbuilding labor.

"But more important than this is the fact that the English not only have the benefit of cheaper labor, but they use it to build cheap ships; that is to say, inferior ships, class for class. This, you will perceive, operates doubly to the disadvantage of American builders in competition with the English.

"The observations that I have offered with regard to English builders will apply with about equal force to German, and to some, though not really so great an extent, to French builders.

HENRY W. CRAMP."

From the Inventor of the Whaleback.

The *Marine Review* has the following expression from Alexander McDougall, of the American Steel Barge Co., West Superior, Wis.: "In reply to yours regarding Mr. Carnegie's idea of a shipbuilding plant in New York harbor. I have thought of this for a number of years, we having built two vessels there, and I could plainly see the disadvantage of doing business of this character without the force and promptness with which shipbuilding and repair work is done in the lake country; and I think that, if a combination of lake interests would undertake to put in a plant for new construction and the repair of ships on a large scale in New York harbor, it would be a very profitable investment, particularly so if the managing sentiment came from practical lake shipbuilders; and if such a plant was established it would be a great benefit to the country at large, as it would enable us at an earlier date to place the American ship in foreign trade."

Pittsburg Foundries Busy.

The current market report of Rogers, Brown & Co. has the following from their Pittsburg representative: "A careful canvass made of the foundries in this immediate district during the past ten days develops that at no time in the past two yeras have they been so full of work, and the outlook for the future is decidedly bright, even though some trouble over the wages of molders may come about on April 1."

THROUGH W. C. Beach, their Pittsburg representative, Pawling & Harnischfeger, of Milwaukee, have secured an order from the La Belle Steel Co., of Wheeling, for another 20-ton traveling crane. The crane is to operate from the mill to the yard on a runway 100 feet in length.

THE JOHNSON CO. TO BUILD BLAST FURNACES.

Though many announcements have been made of the intention of the Johnson Co. to erect blast furnaces and coke ovens adjoining its steel plant at Lorain, O., there has been at no time any official confirmation until within the past week. When the steel plant was completed at Lorain, early in 1895, it was thought to be a matter of but a year or so when blast furnaces would be constructed and the company thus put in possession of the advantages of the lake shore site. But the financial and industrial conditions were not favorable; and the project was kept in abeyance. The trip of President Moxham to England last year resulted well for the company's plans, and the report of Messrs. E. P. Martin and E. Windsor Richards, who came from England two months ago to investigate the matter, made the enlistment of English capital, which before had been regarded as probable, a certainty.

There remain some legal formalities to be completed, but as quickly as these can be finished work will begin. There will be erected two blast furnaces 22 x 100 feet; the necessary docks on Black River, and ore-handling apparatus; 240 retort coke ovens and the necessary by-product plant. The furnaces are expected to give an output of not less than 500 tons each per day. The plans also contemplate an additional blooming mill, which will so increase the capacity of the plant that notwithstanding its own product of approximately 1,000 tons of pig iron a day, the company will still be heavy purchasers of pig metal, at least for some time to come.

The new plant will be pushed with all possible dispatch and the expectation is that the furnaces will be in operation early in the coming year. The Johnson Co. on the completion of its blast furnaces and coke ovens will have advantages not duplicated by any steel plant in the country. To the cheapest assembling of raw materials will be added fuel economies that insure a coke cost equal ton for ton to that of coal delivered alongside works. Connellsville coal will be used and it is probable that the Semet-Solvay ovens will be chosen.

More Steel Works for Alabama.

At the annual meeting of the Tennessee Coal, Iron & Railroad Co. the report of President Baxter showed that the output of material during the year was 3,457,213 tons of coal, 916,492 tons of coke and 541,940 tons of pig iron. The entire shipments of pig iron from Birmingham, Ala., to foreign countries outside the American Continent from July 1, 1896, to Jan. 1, 1898, amounted to 293,996 tons, or an average of about 16,333 tons per month.

Regarding steel production, it was stated that the Birmingham Rolling Mill is now running two open-hearth furnaces on double turn, and its product has been so entirely satisfactory as to find ready sale in this country and in England. The company's sales of basic pig iron have increased so that it is not only shipping it to producers of steel in all parts of the United States where such works are located, but is also sending it to England, Russia, Germany and Italy for steel works in those countries. With the exception of the plant of the Birmingham Rolling Mill Co., there is still no producer of steel south of the Ohio River, and the trade of the South and Southwest offers a home market of the highest importance, beside which the export trade could be most successfully entered by a plant located in Birmingham. The plans and estimates now in Mr. Baxter's possession indicate that by building a basic steel plant the company would be enabled to withdraw a large part of its product from competing at low and comparatively unremunerative prices in distant markets in the United States, and would so greatly improve its position as to enable it to commence payment of dividends upon the common stock. The report says that it is not only to the interest of the company, but a necessity to build a steel plant.

Another Valley Furnace Purchase.

The Shenago Valley Steel Co., of New Castle, Pa., purchased the Raney & Berger Furnace at New Castle last week and will take possession about May 1. The furnace has been operated since the summer of 1897 on a working arrangement between Naylor & Co., of Pittsburg, and its owners, and the product is divided. The contract is understood to be on a tonnage rather than a time basis, and at its expiration the new owners will take control. Before being blown in last summer the furnace was overhauled, the stack relined and 16 tuyeres provided. Some good tonnage records have been made in the present run. The output will average 260 to 275 tons a day. The furnace is located adjacent to the Shenago Valley Steel Co.'s plant and can easily be connected by a private switch.

PERSONAL.

C. S. Stoddard and Charles Markham, directors of the Parkgate Iron & Steel Co., Rotherham, Yorkshire, Eng., were in Pittsburg last week, visiting various iron interests.

Frank W. Edmunds, general sales agent of the Troy Steel Co., becomes secretary of the Q & C Co. on April 1, and will be located in Chicago.

John Walker, who resigned his position with Fraser & Chalmers, of Chicago, a few weeks ago, has taken charge of some promising gold properties at Deadwood, S. D.

C. P. Wheeler, of Pickands, Brown & Co., Chicago, left last week on a pleasure trip of several weeks to California.

H. M. Curry, of the Carnegie Steel Co., Ldt., sails early in April for Europe.

William Ferguson, for the past several years superintendent of the foundry of the Gates Iron Works, Chicago, and before that foreman of the foundry of Fraser & Chalmers, has resigned his position with the Gates works, to embark in the general foundry business for himself, in Chicago.

John P. McCrea, who for many years has been connected in iron commission with A. N. Childs, of Pittsburg, has resigned his position, the change taking effect April 1. He will make no other connections for the present.

F. H. Kindl, chief engineer of the Carnegie Steel Co., Ltd., who has been studying industrial conditions in South America for a year, has returned to Pittsburg.

General Manager Nelson P. Hulst, of the Oliver Iron Mining Co., and T. M. Gilchrist, superintendent of the Mountain Iron and Oliver mines of the company, were in Pittsburg last week.

Andrew Carnegie has added to his benefactions in connection with the Pittsburg Carnegie Library a fund of $10,000 to be used solely for founding a reference collection on technical science to include works on mechanical, civil and electrical engineering, chemistry, metallurgy and manufacturing.

The Sparta Mine.

The Sparta property is located in the Eveleth district on the Mesabi range. It comprises 120 acres. The mine was first opened in the summer of 1897, and the first cargo was shipped in September of that year. The total shipment was 66,722 tons, the average analysis as given in the cargo average sheet being: Iron, 65.45 per cent; silica, 2.98; phosphorus, .029; manganese, .20; alumina, .88; lime, .30; magnesia, .25; moisture, 7.00. It is expected to mine, this year, 400,000 tons, 90 per cent of which will be Sparta, the balance being top ore, known as "Top Brown Sparta," which last year ran 60.52 in iron, 6.10 in silica, .056 in phosphorus, and 9.75 in moisture. The surface at the Sparta is 8 to 30 feet thick, and the ore is mined with a steam shovel. The workings at the mine the past winter indicate that the ore this year will be 66 per cent in iron, less than .030 phosphorus, about .50 alumina, and under 6 per cent in moisture. Physically it will be better this year than last. The average of last year's shipments was 12.50 per cent of ore through a 100-mesh sieve.

The nearest mine is the Genoa, about a half mile away. Three and one-half miles distant is the well-known group of properties, Adams, Cloquet and Fayal. The average, through the 100-mesh sieve, of all ores produced in 1897 from this district did not exceed 9 per cent, and some of the ores mined in the Eveleth field are as good physically as certain ores mined on old ranges. The Sparta is different from other ores of that district, in that it is richer, lower in moisture and lower in alumina and phosphorus than any of them. Its color is blue, and it retains this color after being exposed to the weather. The "Top Brown" ore has the regular Mesabi color.

THE Monongahela Furnaces of the National Tube Works Co. are to be equipped with a Uehling casting machine similar in general design to those now in use at the Duquesne and Lucy furnaces.

GOOD FOUNDRY WORK WITH OHIO SAND.

The half-tone illustration below shows some castings as photographed in the yard of the P. Hayden Saddlery Hardware Co., of Columbus. They were made in the foundry department of that company under the direction of W. M. Scott. The company has been making a specialty of late of electrical, architectural and heavy machinery castings, and after trying different kinds of heavy sand adopted the No. 6 red sand of the Ætna Sand & Clay Co. The result has been smooth, bright castings, which have machined and finished well. The generator shown in the cut was cast in two parts in a dry sand mold, the base and half the generator being in one piece and the top cast separately. The total weight is 8,000 pounds. The spindle is a cold-blast casting weighing 4,000 pounds, made in dry sand. It is the main driving shaft of a billet mill engine. Its coupling, which is also shown, was made in green sand. The weight is 2,000 pounds. The large cylinder, 40 inches diameter, seen at the right of the generator, was also cast in the No. 6 red sand of the Ætna company.

Received from the Trade.

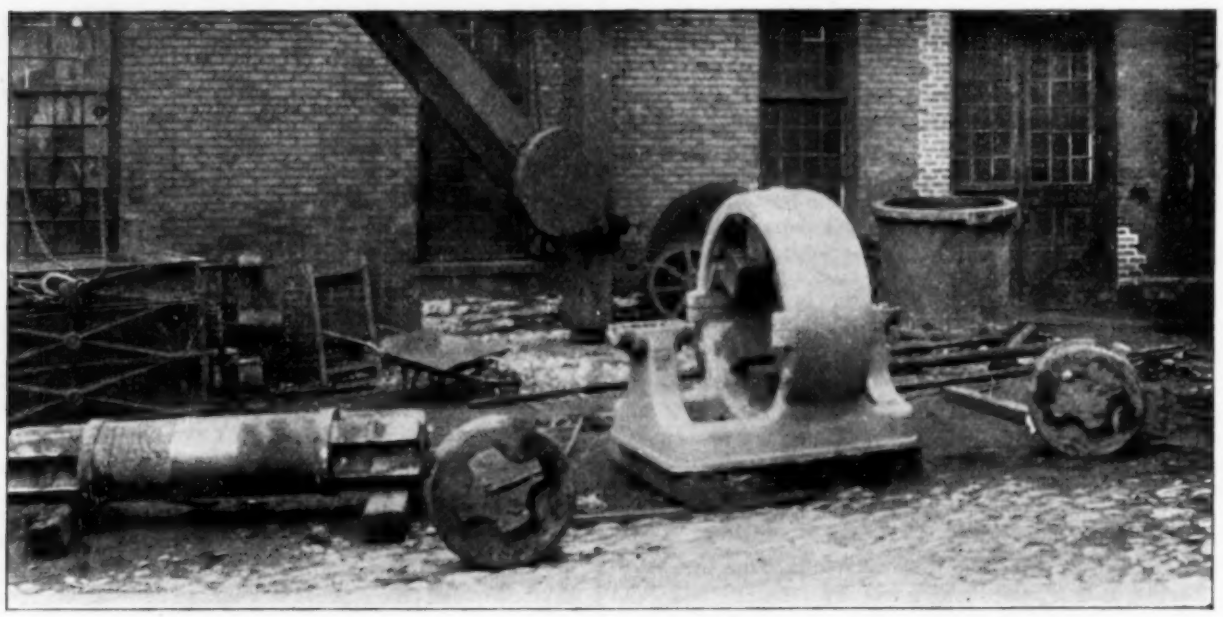
The Ingersoll-Sergeant Drill Co., Havemeyer Bldg., New York, has made its Catalogue No. 41 particularly attractive in paper, typography and illustration. Of the half-tones the most conspicuous is the view of the works at Easton, Pa. The others show the Ingersoll-Sergeant drills as employed in various lines of service for mining, tunneling and quarrying. Four types of rock drill are described—the Ingersoll "Eclipse," the "Sergeant," the "New Ingersoll," and the "Arc Valve" Tappet. The last-named cushions its blow on live steam or air. The others have variable stroke and strike an uncushioned blow.

The last catalogue of the Jeffrey Mfg. Co., Columbus, O., while devoted in particular to the Jeffrey chains and steel cables, as manufactured for the handling of logs, lumber, shavings, sawdust, etc., illustrates in a general way the construction and operation of the system of conveying, which this company has developed on so large a scale. The construction of chain links, cables and carriers, and the method of driving them, are illustrated in detail.

A little treatise on "The Advantages of Electric Motor Direct Drive" comes first in the latest publication of the Northern Electrical Mfg. Co., Madison, Wis. Then follows a description of "Northern" motors, with illustrations of the standard types, open and closed. In later pages are illustrations of Northern motors as employed in various lines of work, with letters from the companies using them, indicating the satisfactory character of the work done and the economy of the electric installation.

AMERICAN STEEL & WIRE CO.

While there is little or no expectation that the Eastern tangles that prevented the closing of the wire deal two weeks ago can be unraveled, the minor Western combination referred to last week is now a fact. Additions to the plants already included may be made before April 4, when the options on the remaining 10 of the plants originally scheduled for the greater combine expire, but this is not likely. The smaller combination takes the name originally proposed for the National one—the American Steel & Wire Co. Incorporation papers were taken out at Springfield, Ill., March 21, by John W. Gates, Isaac L. Elwood and Elbert H. Gary. The capital is $24,000,000, divided equally between preferred and common stock. The plants included, as mentioned last week, are: The Consolidated Steel & Wire Co., seven plants; one at St. Louis, two at Joliet, one at Cleveland, one at Beaver Falls, Pa., one at Pittsburg, one at Allentown, Pa.; the I. L. Ellwood Co., two plants at Dekalb, Ill.; the American Wire Nail Co., one plant at Anderson, Ind.; The Salem Wire Nail Co., two plants, one at Findlay, O., and one at Salem, O.; the HP Nail Co., one plant at Cleveland; the American Wire Co., one plant at Cleveland. It is understood that the American Wire Co.'s plant at Cleveland is bought outright and that its stockholders do not take stock in the new company.



GOOD FOUNDRY WORK WITH OHIO SAND.

The new company expects to take possession of the various plants on April 4. The election of officers has not been held as yet but the list was agreed upon at a meeting held in Chicago last week and is as follows: Chairman, John W. Gates; president, John Lambert; first vice-president, William Edenborn; second vice-president, I. L. Ellwood; third vice-president, S. H. Chisholm; treasurer, E. T. Schuler; secretary, E. J. Buffington; assistant secretary for Chicago, E. C. Lott; assistant secretary for New York, F. E. Patterson; general manager, C. E. Robinson; general superintendent, Frank Baackes; general counsel, E. H. Gary; auditor, C. H. Garvey; board of directors, J. W. Gates, I. L. Ellwood, William Edenborn, John Lambert, Charles Douglass, Alfred Clifford, E. H. Gary, Frank Baackes, S. H. Chisholm, E. J. Buffington, H. B. Schuler; executive committee, I. L. Ellwood (chairman), S. H. Chisholm, J. W. Gates, William Edenborn, E. J. Buffigton.

Chairman Gates has given out the following statement concerning the consolidation: "The company will have its general offices, as recently stated, in this city. Its 14 plants will be distributed as follows: One at St. Louis, two at Joliet, three at Cleveland, one at Beaver Falls, Pa., one at Pittsburg, Pa., one at Allentown, Pa., two at Dekalb, Ill., one at Anderson, Ind., one at Salem, O., one at Findlay, O. In addition it will have offices and warehouses in San Francisco, Portland, New Orleans, Denver, St. Paul, Louisville, Chicago, Cleve-

land, Pittsburg, New York, Montreal, Canada, and London, England.

The new company will purchase the properties mentioned and start in active business on the 3rd day of April, 1898. It will have a producing capacity of from 700,000 to 800,000 tons of wire and wire rods, which will go into the various products now made by them, including wire nails, barbed wire, woven wire fencing, plain, galvanized, bright, 'market,' and other varieties of wire, together with sundry other products. The production mentioned is about 75 per cent of the total production of the United States, so that the new company by no means has a monopoly of the business.

"The component companies have a foreign trade of about $3,000,000 per annum at the present time, which they expect to increase to $10,000,000 or $15,000,000 in the near future. This consolidation means doing away with disastrous competition and making savings in the various economies of manufacture, freight rates, cross-shipments of goods, etc., and does not necessarily mean any advance whatever in prices, the object being to produce the goods at the lowest possible price and furnish them to the consumer at a small margin of profit."

The principal wire companies not included in the limited organization are these: Washburn & Moen Mfg. Co., with plants at Worcester, Mass., and Waukegan, Ill.; New Castle Wire Nail Co., New Castle, Pa.; Oliver Wire Co., Pittsburg; Cleveland Rolling Mill Co., Cleveland; John A. Roebling's Sons Co., Jersey City, N. J.; Trenton Iron Co., Trenton, N. J.; Cincinnati Barbed Wire Fence Co., Cincinnati; Gilbert & Bennett Mfg. Co., Georgetown, Conn., and Blue Island, Ill.; Dillon-Griswold Wire Co., Sterling, Ill.; Grand Crossing Tack Co, Chicago; Pittsburg Wire Co., Pittsburg.

WAGES AND PRICES OF MILL PRODUCTS.

The Amalgamated Association of Iron and Steel Workers is getting the ideas of its members in shape to be considered at its annual meeting in Cincinnati, May 17. Early in March suggestions for changes in the scale or alterations of any sort, were solicited from all over the country. These are now being compiled in pamphlet form and sent to all branches of the association for discussion. The work of the convention is thus materially decreased. The sentiment of the workingmen as expressed so far is very conservative, as the concessions of manufacturers last year are not forgotten; nor is the fact overlooked that prices on all mill products are lower than those of a year ago. In line with this sentiment the *National Labor Tribune* last week published the following comparison of prices ruling to-day and a year ago. The *Tribune* says: "The table shows that in the main prices are lower to-day than they were at this time last year, a fact that will likely come as a surprise to many, as the idea generally prevails that with the manifestly better tone existing in all business circles, there is a corresponding increase in prices. The table we print below is an accurate comparison of rates in the principal commodities in which the members of the Amalgamated Association, as scale compilers, are interested:"

	March 9, 1898.	March 10, 1897.
PIG IRON.		
Bessemer Pig, Pittsburg	$10.30	$10.65
Gray Forge, Pittsburg	8.85	9.40
BILLETS, RODS, ETC.		
Steel Billets, Pittsburg	15.25	15.50
Steel Billets, Chicago	17.50	18.00
Wire Rods, Pittsburg	22.50	21.00
OLD MATERIAL.		
Old Steel Rails, Chicago	8.50	7.50
Old Iron Rails, Chicago	12.25	11.75
Old Car Wheels, Chicago	11.50	10.50
Heavy Steel Scrap, Chicago	7.50	8.00
FINISHED IRON AND STEEL.		
Common Iron Bars, Youngstown	0.92½	1.00
Steel Bars, Pittsburg	0.92½	0.95
Tank Plates, Pittsburg	0.97½	1.10
Beams, Pittsburg	1.75	1.55
Angles, Pittsburg	1.00	1.05
Skelp, Grooved Iron, Pittsburg	1.05	1.10
Skelp, Sheared Iron, Pittsburg	1.10	1.22½
Sheets, No. 27, Chicago	2.05	2.10
Sheets, No. 27, Pittsburg	1.90	1.95
METALS.		
Tin Plate, Domestic, Bessemer, full weight, New York	2.90	3.20

THE plant of Spang, Chalfant & Co., Etna, Pa., was put on three turns Sunday night.

THE LATE SIR HENRY BESSEMER.

THE TIN PLATE MARKET.

Some interest is still being shown in the tin plate mill negotiations, and it is given out authoritatively that certain promoters in Chicago who have successfully financed other large consolidation schemes have the matter in hand, and hope to bring together the conflicting interests and to reconcile the mills with the jobbers in New York, who now distribute a large proportion of the tin plates made in this country. Nothing definite in regard to the plan is obtainable, but it is generally supposed to be on the lines of the recent wire consolidation. It is believed a consolidation of this kind would be well received by dealers and consumers. The market for the past three years has steadily declined and has been continually in favor of the small consumers who buy from hand to mouth, and against the large concerns that find it necessary to contract their wants a number of months in advance. With few exceptions every large tin plate contract covering more than three months' deliveries has proved a bad purchase for the buyer before its completion.

The past week has been unsatisfactory. Prices continue unsettled and comparatively little business either for spot or future has been done. Western sellers are firmer than they were a month ago, being shy of future contracts and having few plates to sell for near-by deliveries.

Pittsburg mills are freer sellers over the entire last half of the year, and a number of large contracts have been placed for the late deliveries showing decided concessions from the prices asked for near-by deliveries. There is no quotable change in the market for deliveries before July, which stand as follows, Central Western Mills:

	IC	IX
CHARCOAL TINS.		
Lisvane Grade,	$3.45	$4.20
Calland Grade,	3.65	4.35
COKE TINS.		
IC, 108 lb. Basis weight,		$2.95
100 lb. " "		2.80
95 lb. " "		2.70
90 lb. " "		2.75
85 lb. " "		2.60
80 lb. " "		2.60
TERNE PLATES.		
IC, 216 lb., 20 x 29		$5.85
200 lb. "		5.55

For deliveries July to December the above prices on coke tins have been shaded fully 10c per box; while 5c to 7½c per box concession is the regular thing.

THE Sterling-Wheeler Projectile Co., of Demmler, Pa., were awarded contracts by the War and Navy departments last week, aggregating $551,900. Of this $300,000 was for the army. The projectiles range from 4 to 13 inches.

SHOP PHOTOGRAPHY.

BY HOWARD P. FAIRFIELD.

There is perhaps no field in which the camera has been more felt of late years than in engineering lines, and its continually increasing use here must be taken as proof of its value. Bridge building firms employ it as a means of reporting from day to day the progress of work, and when all is completed the camera comes in as a valuable assistant in advertising, telling all future buyers how the completed structure looks. The head of a large Western machine shop said not long ago that he knew of no way of "telling the story" that compared with photography. The object of this article is to show that it can be made useful in any shop, and some of the methods of getting desirable results.

By having its own outfit and some one or more of the regular force of employes expert enough to use it, a firm is independent in this as in other work, and will find so many places where it can be used to advantage in advertising, in making records of work performed, in views of the shops, both interior and exterior, and thus showing from year to year the growth of the business, changes in the product, methods of performing difficult jobs—in fact, in such a multiplicity of ways that the wonder will be how it was dispensed with so long. No fancy outfit is needed, but if the very highest class of work is desired a costly lens makes it easier. As my object is to indicate the methods of work, such as any one can do with a little practice, mention will be made only of the ordinary outfit needed.

The camera should be for a 5 x 7-inch or a 6½ x 8½-inch plate, with a long draw of bellows. This enables the operator to use different lenses, and also is convenient for copying.

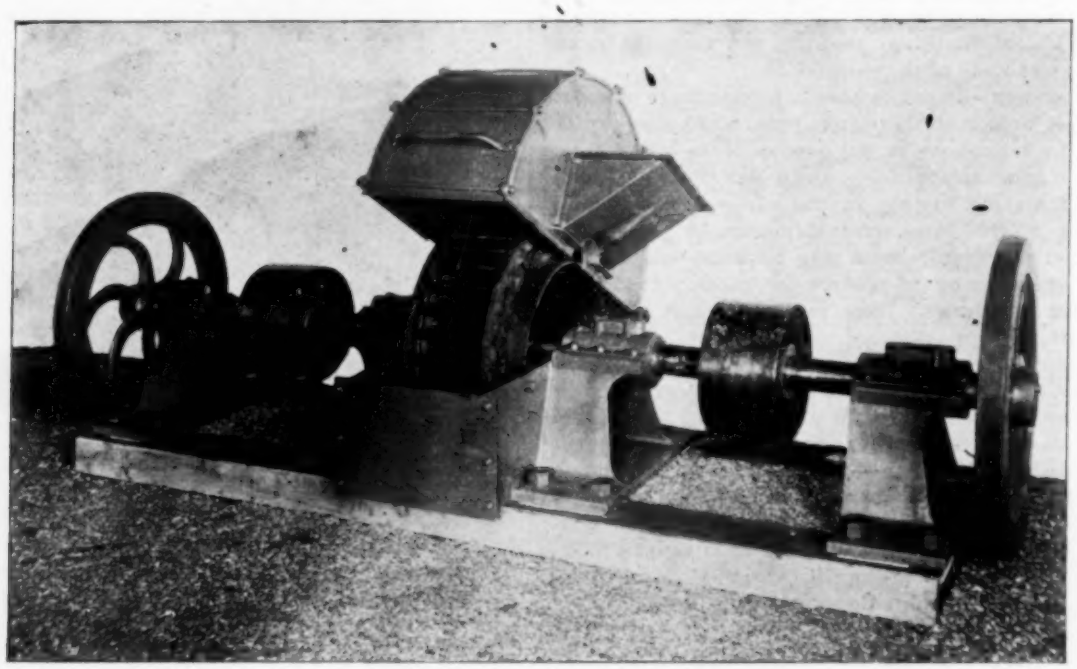


FIG. 1.—SHOP PHOTOGRAPHY.

It should have all adjustments, such as rising and sliding front, swing-back, etc. If it is to be carried about much, it will need to be of such a design as will admit of folding it into a small compass. Some of the "long focus" hand and tripod cameras are very desirable, and are so complete as to be practically universal.

The lens should be of the rectilinear type, and one listed for at least the next size larger plate than the one on which it is to be used. This makes it possible to use it full open when exposing in dark places, and yet get clean work. There should be two of these—one that is called, generally, a "wide-angle," and one that has a focus equal in length to 1½ times the longest dimension of the plate used. The wide angle lens is for use in confined situations. As it gives a somewhat distorted view, it should never be used if the longer focus can be. These should be interchangeable in some one of

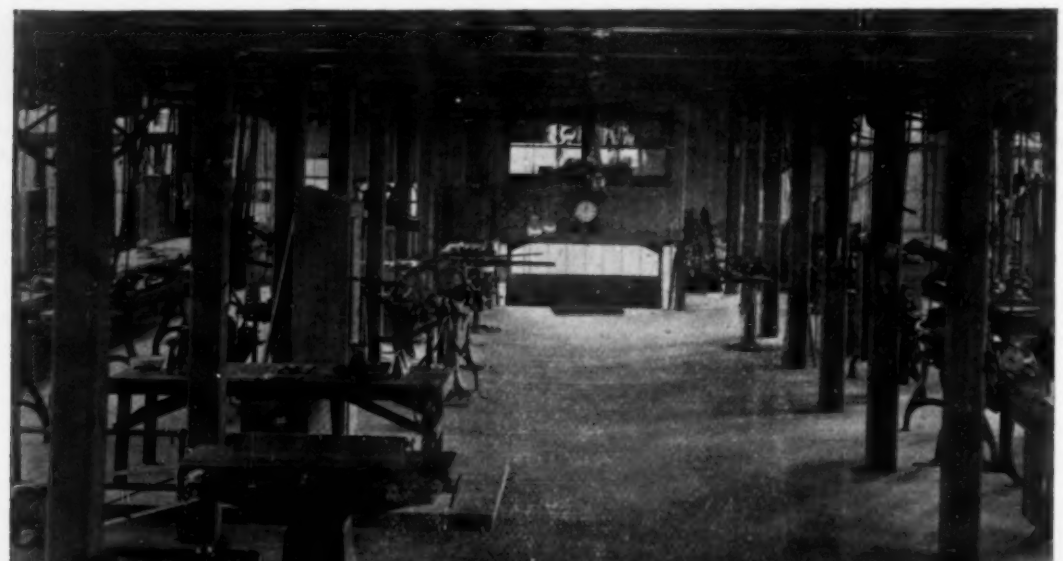


FIG. 4.—SHOP PHOTOGRAPHY.

the automatic shutters sold by the makers of all good cameras.

The "dark room" equipment consists of a sink with running water, at least four hard rubber trays, two that will take a single plate of the size used and two that will take two plates at one time. One of each size is to be used in developing and the others for toning and washing prints. Mark them with gilt paint, and only use them for their regular purposes. A rubber fixing box for the hypo. solution and a wooden box for washing are necessities. This last must have a connection for rubber tubing near the bottom. Setting this in the sink and attaching the tubing to a faucet, the water flows up by the plates and over the top. The boxes should be provided with grooves to hold the plates upright and prevent their touching each other. A two, four and eight-ounce graduate with a few bottles complete an outfit that will be found very convenient.

The room itself must be provided, of course, with a window covered with ruby fabric, and some artificial light back of it. Dry plates of some good make should be used. And do not waste time "shopping around," trying everything that comes along.

Blue print, bromide, or any of the printing-out papers can be used for finished prints.

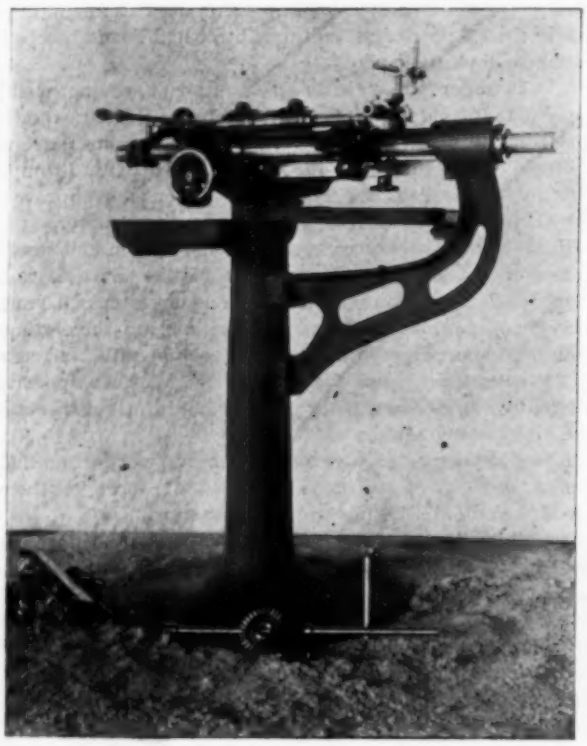


FIG. 2.

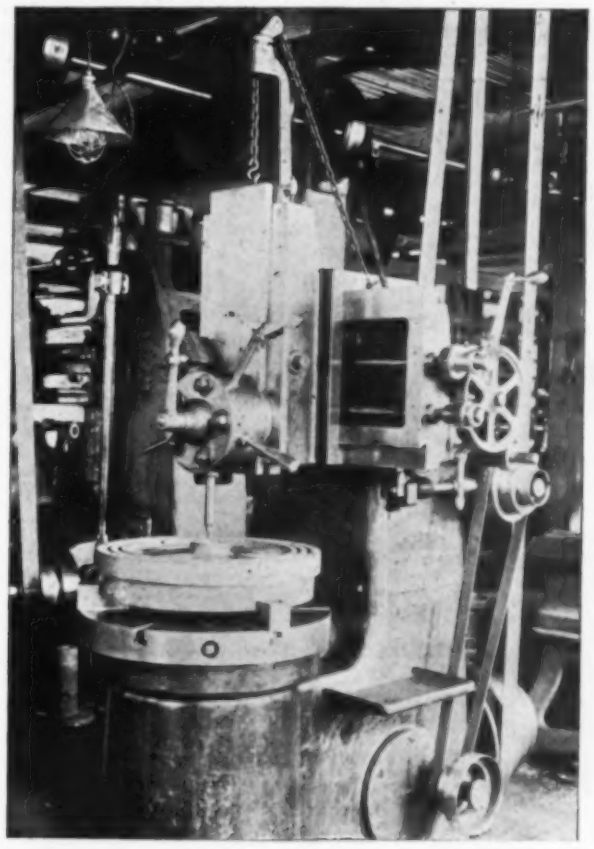


FIG. 3.

SHOP PHOTOGRAPHY.

Tone these last in a plain gold bath, and shun all combined baths if you wish for permanent prints. Blue printing is easy and cheap, but does not bring out the detail so well as some other papers.

The camera, lens, shutter, dark-room outfit, with dry plates and paper enough to begin work with will, if of good quality, cost $50 or $60, allowing for trade discounts.

To get views of a machine for use in an illustrated catalogue requires that the machine shall be painted some actinic color. A pale slate color of the kind usually called "flatting" by painters is the best. If not too large, move the machine to the best lighted part of the shop, or what is even better, the north side of the building out of doors. If too large for this to be done it will require that the best of what light there is be made use of, remembering that the difference in light and shade make the picture. Yet these differences must not be too pronounced or the effect will be harsh. Note, by looking on the ground glass, which surfaces reflect too much light and those that reflect too little; then either tone the high lights down or light the shadows up to them. Usually both things are done. Mirrors are excellent for reflecting light into shadows, care being taken that they do not show in the picture. Powdered chalk on the edges of projections, such as ribs, will cause them to show distinct from the rest, and whitewash sprayed on polished parts will tone them down.

A background of cheese cloth must be furnished and should be kept agitated slightly while the exposure is being made. Unless it is desired to show the floor under the machine, fine shavings spread thinly reflect light into dark corners. If the floor is wanted, spray it with whitewash. Any aperture that does not show through to the background can be brought into prominence by placing white cardboard back of it.

When the machine is in a very dark part of the building and too large to be taken elsewhere, recourse must be had to some artificial light. Magnesium powder is much used for this. If it is used in a "flash lamp" this must be moved about when making the exposure. A better way is to lay several lines and small piles around in front of the machine, and after opening the lens flash these one after the other and close the lens immediately. In a place of this sort lighted candles placed on different parts of the machine will aid in focussing. Neglect the machine and focus only on the candles. After the exposure—and this will take from a few seconds to many minutes, depending on the amount of light reflected and rapidity of the lens—leave everything as it is until development. If the negative is not just right, expose until one is got that is.

Rules for developing come with all the best makes of dry plates, and formulæ for mixing the solutions used in this work. Full directions for using the different papers are found in each package. A great aid to any beginner, though, is a small book, "The Amateur Photographer," sold by all dealers in photographic supplies.

The above outfit, placed in the hands of some of the bright young men in the draughting room or shop, if they are allowed time to practice somewhat, will soon give a firm some one to call upon at any time and at very small cost.

Fig. 1 shows a properly painted and lighted machine. In Fig. 2 the machine was taken with no time spent except to put down the shavings and hang the background; a little retouching in this negative would give a fine print. Fig. 3 is a view of a machine taken while it was in use, and with no time spent to give it light other than it had at the time. This could be made suitable, even for a catalogue illustration, by blocking out with an opaque paint all of the negative except the part wanted. In Fig. 4 is an interior taken on a non-halation plate. The shadows show that the sun was against the lens yet halation is prominent by its absence.

THE FOUNDRIES OF JAPAN.

(Special Correspondence.)

YOKOHAMA, Feb. 20.—When I left the office of Messrs. Rogers, Brown & Co., at 31 Nassau st., New York City, with instructions to proceed to Yokohama, Japan, I was entirely ignorant of the iron industries of the Orient, and inquiries on the subject were productive of little information. Placing the reader of this letter in the darkness that then surrounded me, I shall try to help him see in part what Japan has of interest to the iron world at large. Japan is old. The recorded history of the island extends back some 1,200 years—not only a history of events, of successive reigns and downfalls, but in part of metallurgy and of metal working. Where is this history found, you ask? Go with me a short journey from Yokohama to Kamakura, and view there the colossal bronze image of the Great Buddha, Dai-butsu. There it stands, or rather sits, an awe-inspiring piece of workmanship. It is 50 feet high, 98 feet in circumference; has a face 8½ feet long, and each eye is 4 feet across. The ears are 6½ feet each, and the nose 3 feet 8 inches. From knee to knee it measures 36 feet, and the circumference of the thumb is over 3 feet. This huge piece of bronze was cast back in the 12th century. Is not this a page in the history of metal working? But Dai-

FIG. 1.—IMAGE OF DIA-BUTSU, KAMAKURA, JAPAN.

butsu sits cold, calm and serene, a sphinx keeping closely within herself the secret of the centuries, the origin from which she sprung.

In the museum halls at Kamakura and at Tokio hang the sword blades swung by heroes of long ago. The history of the man is told, but that of the metal blade is a secret. The huge armor of heavy, metal so nicely fashioned, is dwelt on by your guide at great length in connection with this or that warrior; but he has naught to tell of the metal. It is recorded that in times gone by the Japanese were versed in the art of mixing and working metals; and looking on the prodigious Dai-butsu and the size of the innumerable temple gongs resounding on all sides throughout the Island, sufficiently convinces one that the record is true. It is proper to conclude that the Japanese of to-day are not what they were years ago in the handling of metals. But there are evidences of an attempt to advance in the manipulation of baser metals; and in a previous letter I referred to the government appropriation for steel works and foundry, about $4,000,000 being asked for to carry out the plans. The success or failure of the project will develop in the future. Just such a large enterprise was started in Tokio for the manufacture of cast iron pipe. The works were built and pipes were cast, but the smattering of knowledge on the subject was just sufficient to make a gigantic failure. Corruption, so common in Japan, came in; poorly made pipe was accepted by the "city fathers," and to-day the scandal is still discussed, while the works are silent.

This does not indicate that the government foundry will be a failure; but it should teach the promoters that corruption and another prevalent characteristic, self-conceit, must be shunned, and that the manipulation of iron on a large scale must be in charge of a master hand, and not of a novice who has "scanned the field o'er" in a trip among the nations.

But Japan is progressing, especially in the construction of machinery. Tokio now turns out dynamos and electric apparatus. She has her car construction works, ship yards, and numerous pump and engine works. Some of these interests are large and consume a good tonnage of pig iron, sheet and bar steel, rivets, nails, etc., all of which is imported. A great deal of assembling of parts is done and the finished article turned out. Japanese electric apparatus is well made; as are pumps, engines and ships, though the last-named are not of great size. No faces of foreigners are seen in connection with any large concerns in Japan, excepting a couple in the Imperial Railroad and the Mitsu Bishi dock yards at Nagasaki. Most large places employed imported talent at the outset, but when their knowledge on the subject had been absorbed the Japanese took their places.

Works under Japanese control, as a rule, are not well kept up. The machines and engines are neglected; they look dirty and ill-kept, and an overhauling only takes place when a breakdown occurs. On the whole, they are a most improvident lot of mechanics. They never invent nor improve; but they copy any and all things in a surprising manner.

Kobe and Osaka are next to Tokio in iron and steel consumption. Osaka, the Manchester of the East, is a busy place, and its many high, needle-like smokestacks, so uncommon in Japan, throw down the gauntlet to the earthquake and typhoon. Here are immense cotton mills and smaller silk works, which give the city a busy, Western appearance. These two cities are rapidly growing, and in time will become the distributing centers of the island.

Kobe has large ship yards and engine works, and the Imperial and Sanyo railroads show to the foreigner the most modern and enterprising works in Japan.

The third center of industries is on the southernmost island of Kiusiu. It is Nagasaki, the city of the beautiful land-locked harbor. Here is the largest shipbuilding plant in Japan, and one of the few enterprises under the management of a foreigner. On this harbor are numerous small shops constructing small craft and engines, supporting within their direct vicinity a number of foundries and machine shops. Far back into the country these are found in all the towns, and are alike as two peas in a pod.

In my visit through these sections the foundries most interested me. From Yokohama and still further north down to Nagasaki on the south, and throughout Kiusiu island I found them. In every small town and hamlet are one or more; and tucked in between dwelling houses and shops in the cities are many hidden from the casual view. It seems scarcely correct to dignify them with the name foundry. They are small affairs, some hardly 20 feet square and rarely twice that size. The work they turn out is equally minute—mostly pots, pans, kettles and culinary articles, besides such other small castings as might be called for in a small village. The city foundries often have larger work, but little more floor space. They do the repair work for the mills and work sublet by the ship yards, both large and small, and turn out in good form pump and engine parts. The ship yards and railroads support fairly equipped foundries, though numerous improvements could be made. They lack modern cranes, cupolas and, in most places, blowing equipment.

A small Japanese foundry is not so extraordinary; it is as our foundries, but ill-kept and on a very small scale, or as ours might have been years ago. The cupola is a little portable affair, constructed in cylindrical sections, and according to the diameter is the height. For instance, a 24-inch cupola will be in three sections, each about 20 inches deep, making

the cupola five feet high. The first or lower ring contains the tap and tuyere hole, also the bosh. No charging door is necessary. Wood, coke, and iron are simply thrown over the top, and the wind enters at one tuyere hole. The molten metal remains in the bosh until it reaches the tuyere and is then tapped. After a heat the cupola is taken down, cleaned out and placed aside until next time. In proportion to the size of the heat sections are added to the built-up cupola. A larger foundry will have on hand several sizes of these cylinders and will set up in one corner of the foundry the size sufficient to supply the day's cast. In a few places fans supply the wind, but in the majority bellows worked by foot or hand-power perform the function. No cranes nor tackles hang from the roof. Little outside the simplest essentials is in evidence, and flour is never seen. Parting sand is a luxury, and clamps are unknown, a few stray pigs of iron, or a man or two, doing duty as weights. Anything does as a rammer, and home powdered charcoal is generally used as facing.

A pour-off on a hot day is interesting. I entered one of these foundries about 4 in the afternoon. They had just tapped and pouring had begun. Catching the metal in small ladles as it ran, the men were hurrying back and forth, as is customary in any foundry; but the spectacle was odd. Not a man had more than a narrow breech cloth on his body, and on the feet were rope sandals. It looked uncanny, and the dark bodies against the molten metal gave a suggestion of Dante's Inferno. This scant dress is common in Japan at large. Modesty is unknown, and naturally when provocation such as is common in a foundry presents itself, all unnecessary apparel is discarded.

These foundrymen are not rapid workers, and their pay is about proportionate to the work they do. No associations are in vogue, and no walking delegate dictates to the proprietor. The men receive their stipend and are satisfied. A laborer or coolie is paid 20 or 30 silver cents a day, equal in gold to half the amount, and a first-class molder gets from 60 to 70 cents. The foreman, or as he is termed, "No. 1," receives the munificent sum of $1.25, in exceptional cases $1.50. Think of an American foundry foreman working for half what our molders now get. But on this scant pay the Japanese save money. They stuff themselves with rice, and on two cents a day can serve up a meal fit for a Japanese king. They are not burdened with tailors' bills to any extent, and the exposure to which they subject themselves would serve to breed a nation of consumptives. As a rule the Jap molder does good though very slow work. Intricate cores are nicely made, and the castings turned out, considering the antiquated paraphernalia, are very creditable.

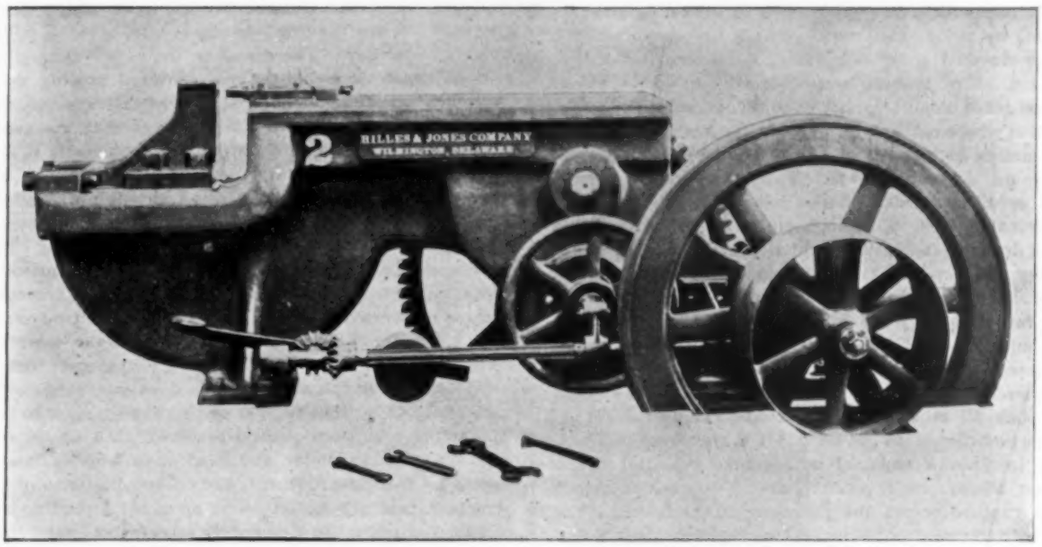
As the industries of Japan grow, so will the foundry. In such case let us hope they will profit by the experience of other nations, and appreciate early in the advance the fallacy of the idea that "anything is good enough for a foundry."

IRVIN MCDOWELL.

HORIZONTAL FLANGE PUNCH.

The standard No. 2 horizontal flange punch manufactured by the Hilles & Jones Co., Wilmington, Del., is illustrated herewith. The special nose or die block, which is a feature of the machine, is adjustable to and from the punch for various classes of special work. It is a substantial block of cast steel, well supported and securely bolted to the frame. For truck work or irregular forms a die block of this description is often necessary. The machine shown is capable of punching a 1 inch diameter hole through 1-inch thickness of steel. Control is by means of a clutch operated through a foot lever. The hand wheel shown is for bringing the punch up to a mark before throwing the clutch into gear. The machine is complete on one foundation.

Many of these horizontal flange punches, embracing different types of nose, have been built for important work in large concerns in the United States and in other countries, larger and smaller sizes being included. An illustration of a larger machine appears elsewhere in this issue.



HORIZONTAL FLANGE PUNCH.

Has Large Possibilities for Steel Works.

The rapid transit situation in New York, which is of especial interest to steel companies because of the 65,000 tons of shapes involved, takes a more favorable aspect since the decision last week of the Appellate Division of the Supreme Court of New York. The former decision, by which the bond to be required of contractors was placed beyond the reach of any contractors likely to bid, was modified by specifying a bond of $14,000,000, to cover the period of construction and equipment, and a continuing bond of but $1,000,000 to compel operation by the contractors.

Another step in New York underground transit matters was the introduction at Albany last week by Senator Ellsworth of a bill to bring to an end the present Rapid Transit Commission and to create in its place a bi-partisan commission. This bill authorizes the Mayor to appoint a commission to consist of four citizens of New York, not more than two of whom shall, when appointed, belong to the same political party.

REPRESENTATIVES of the Pennsylvania Lines, west of Pittsburg—Pittsburg & Lake Erie, Pittsburg, Bessemer & Lake Erie, Pittsburg & Western, Wheeling & Lake Erie, Cleveland Lorain & Wheeling, Erie, and Cleveland, Canton & Southern—met in Pittsburg March 19 to fix coal rates for the lake season soon to open. The tariffs, with some slight changes, will be the same as for last year.

THE structural iron workers of Pittsburg organized last week and decided on a new wage scale which they will demand after April 1. It calls for 30 cents an hour and nine hours a day, except on city work; on this, an eight-hour day.

Review of the Technical Press.

[Translations, Condensation and Comment expressly for The Iron Trade Review by Dr. Richard Moldenke.]

Uniformity in the Testing of Iron and Steel [*Baumaterialienkunde*, 13, 14.]—J. Barba, chief engineer, supplements the report made by Councillor Ast, which was reviewed in these columns recently. He goes more fully into the philosophy of testing materials, and outlines a plan of operations which is calculated to bring out the actual value of the material, rather than the empirical one by comparison with test bars of arbitrary dimensions. Omitting the general discussion on the utility of tests, the following thoughts commend themselves to our attention. The variety of specifications for tests now in use are not wholly based upon a proper understanding of the metals dealt with; they have been sanctioned by custom and will probably be modified only as critical study brings out facts which can be accepted by all. The mere fact that specifications are continually made more severe shows that the material furnished is usually found to be not quite what was expected. Impact tests, which give a better insight into a material than the usual slow deformation tests, are not used as much as they should be on account of their complexity. Tests of materials must serve two objects. First, that the metal can be subjected to the various processes of manufacture with a fair expectation of obtaining good results; and, secondly, and more important, that after the pieces are finished they will undergo the service they are intended for. Now the ordinary tests will answer very well for the first set of conditions, but as to the second, there is not that relation which is taken for granted between tests involving deformation such as tensile and transverse, and the actual service the metal is subjected to. This is easily seen when it is remembered that no deformation is supposed to take place at all in actual service. Custom, however, has sanctioned this method of drawing conclusions which is at the same time unsatisfactory and empirical. This brings the question to a discussion of the elastic limit of a material. This is a point which is very difficult to observe satisfactorily, and depends so much upon the ultimate structure of a metal that the whole subject must be still considered an open one. The microscope really gives us a better insight into the value of a material than all other tests. Unfortunately, the process is too tedious and cannot as yet be adopted in current practice. Take for instance a material with coarse crystals; a slow tensile test allows the crystals to stretch to such an extent that when rupture occurs the character of the fracture is at variance with the real condition of the material. It is therefore of the utmost importance in testing a material to reduce the tendency of deformation to a minimum in order to obtain its true valuation. This can be done readily with our present testing systems by taking the test piece and carefully nicking its smallest section all around, making a deep and sharp-edged cut. The fact that there is no deformation in the balance of the test piece enables it to serve for further work. Furthermore, by reducing the cross section to a very small quantity and magnifying the force applied by means of suitably constructed testing machines, new light will be thrown upon the subject. Attention is called to the experiments of M. Frimont with punching and shearing tests, all of which were reviewed in these columns recently. In these tests very small cross sections were used, but the results are none the less exceedingly close. It will be remembered that the frame of the punch in springing registered the amount of pressure applied. If now the dimensions of such a machine be arranged to suit the maximum strain required, and the elastic deformation be magnified suitably, a piece of apparatus will be made available which, in the absence of shock, will give excellent results. M. Barba now calls attention to the remarkable concordance of punching tests, especially with notched specimens. Impact tests may also be made with such specimens which will break without producing any deformation, and with only one blow of a given weight always dropped from a given height. By introducing a dynamometer to measure the impulse thus imparted, the resistance can be readily calculated.

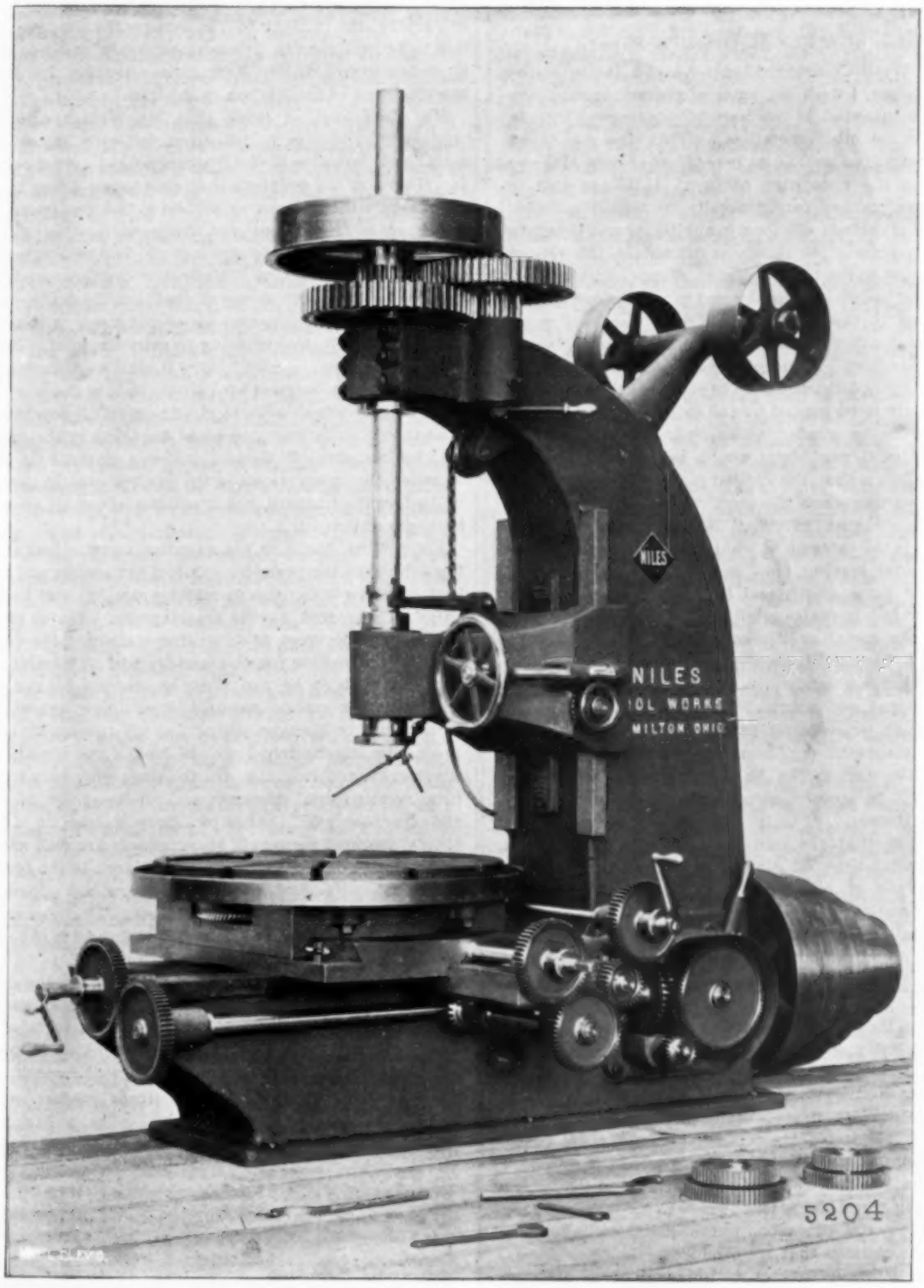
It will be seen from the above memoranda that no matter how strict the various tests made heretofore were intended to be, the real structure of the material was not taken into account. The study of steel in the way outlined above, or in any other way following analogous principles, opens a new field of investigation in which the important question of the elastic limit is given due weight. The method of testing nicked samples seems to give very trustworthy results. It might be mentioned that it is now in use in the French marine. Mr. Barba finally outlines the programme of study the commission of which he is a member proposes to follow in solving the question of uniformity in the testing of iron and steel.

By-Products from the Blast Furnace [*Engineering Magazine*, March.]—Mr. A. H. Sexton gives some figures on the amount and value of by-products as recovered from blast furnaces in Scotland, which use splint coal. While coke is used almost exclusively in the United States and England for fuel purposes, the subject is of considerable interest in connection with the saving of by-products obtained in the coking process. The coke yield of the Scotch coal is about 60 per cent, and as much as .32 to .36 ton of this kind of coal is used in making one ton of pig iron. The actual yield of sulphate of ammonia per ton of coal is 22 to 26 lbs. The enormous amount of gas which it is necessary to treat to recover the tar deterred blast furnace managers from making the attempt until Messrs. Alexander and McCosh, of Baird & Co., undertook it at the Gartsherrie works, in 1879. The plant they erected was designed to take care of 62½ millions of cubic feet per day. The result of their preliminary experiments showed them that the gas required cooling and then thorough scrubbing. The first part of this was easy enough, but the washing presented difficulties. as the condensed products persisted in remaining suspended in the form of a finely divided mist. The process may be described as follows: The gas from the furnace passing through a dust-catcher, enters a long main to go to the first or atmospheric condenser. Here it cools a little and deposits some of the tar. This air condenser in one case consists of a series of vertical 40-ft. pipes, 2½ feet in diameter. Of these 200 are so arranged that the gas must travel through 20 tubes alternately up and down. Now comes the second condenser, or rather the water cooler, built on the principle of a huge surface condenser for marine purposes. Even this arrangement does not remove the tar and ammonia, so that regular gas scrubbing must be resorted to. In one plant four of these are used, each about 100 feet high, 12 feet in diameter, and filled with wooden boards set on edge. This arrangement, and others similar to it in construction, promote the breaking up of the ascending currents of gas, and allow the descending streams of water to thoroughly wash it. The gas must now be drawn by some form of exhaust, as the resistance introduced has wiped out all of its initial velocity. The gas now goes to the stoves and boilers, while the condensed tar and the ammonia water are run into settling tanks for separation. Mr. Sexton points out the great future for this purified gas by exploding it direct in gas engines, and cites several examples of its successful use. The ammonia water is run through continuous steam heated evaporators, to expel the ammonia, which is in turn absorbed by sulphuric acid placed in leaden boxes. The resulting crystals of ammonium sulphate are taken care of automatically. The tar obtained amounts to about 40 gallons per ton of coal. This is heated in stills to expel the water and the resulting dehydrated tar, amounting to 16 gallons per ton of coal, goes into the market. Unfortunately, this tar is not like the regular gas tar obtained by the direct distillation of coal; still it commands some value for the pitch and phenol contained. Some figures are given relative to the cost of installation and operation of a by-product plant, which show that a handsome profit may be made. Mr. Sexton concludes that whenever a suitable coal can be obtained, it is quite possible that a direct use, with the recovery of by-products, would be better than separate coking.

PRESIDENT W. L. Brown and Manager W. I. Babcock, of the Chicago Shipbuilding Co., took, in Cleveland last week, a contract for an immense steel schooner. The boat will be built for the Minnesota Steamship Co. It will be 376 feet keel, 390 feet over all, 48 feet beam, and 26 feet deep. On the present draft of water, 16½ feet, in lake channels, the schooner will carry something over 6,500 tons.

HEAVY VERTICAL MILLING MACHINE.

The No. 6 vertical milling machine of the Niles Tool Works Co. is shown in the illustration Its features are the driving of the spindle directly by belt for fast speeds and its back gearing for heavy work. The spindle has a vertical adjustment and the lower bearing is also adjustable, supporting the spindle close to the work. Special facilities are offered by this machine for profiling work, since the circular table has



HEAVY VERTICAL MILLING MACHINE.

longitudinal, cross and circular motions by power or by hand.

The maximum distance from the table to the end of the spindle is 26 inches. Distance from the center of the spindle to the column, 24 inches. The diameter of the circular table is 42 inches. The longitudinal traverse of the table is 20 inches and its transverse traverse, 32 inches. The driving cone has four steps for a 4½-inch double belt. The feeds are cross, longitudinal and circular, operated either from the front or the side of the machine.

The Johnston Boiler.

Through an inexplicable omission, the name of the manufacturer of the Johnston safety water-tube boiler, described on pages 14 and 15 of our last issue, did not appear in connection with the article. The boiler is manufactured by the Brownell & Co., of Dayton, O., well-known builders of engines and boilers.

THE Philadelphia *Times* says that preparations have been made at Cramp's shipyard for the construction of four steamers for the American Mail Steamship Co. The vessels will be the finest and fastest of their class ever built, and will be constructed in conformity with a contract with the Government requiring them to be built upon plans approved by the Navy Department, to make them available as auxiliaries in the event of war. The steamers will be 280 feet in length, with 36 feet beam, and about 2,000 tons burden. They will probably ply between Boston, New York, Philadelphia and Jamaica.

THE WESTERN FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Western Foundrymen's Association was held Wednesday, March 16th, at 7:30 P. M., at the Great Northern Hotel, Chicago, with the president in the chair.

The application for membership of A. W. Bodell, Chicago, was submitted and Mr. Bodell was elected a member of the association.

Discussion of Major McDowell's Paper.

Mr. Thos. D. West [Communicated]: As you invite a discussion on the paper, I wish to enter a protest against the claim that it is essential in analyses of pig irons to include the carbons with the other metalloids. This view was taken at your last meeting, as well as on several other occasions, by men well up in the chemistry of iron. I believe that in foundry pig iron, carbon can generally be wholly ignored. The state of the carbon, whether graphitic or combined, in any brand of pig metal, is chiefly regulated by the rate of cooling as it is cast at the blast furnace. Suppose a blast furnace when tapped had its stream directed to two different channels, one leading to the ordinary sand bed and the other to "chills," or iron molds. Analyses would show the carbon in the chilled or sandless pig to be largely combined, while in the sand pig, the graphitic would be in excess of the combined carbon. If we are to be guided by the carbons, the chilled or sandless pig would be graded as an iron to make hard castings, while the sand pig metal would be set aside for soft castings. The fact is that the chilled pig would give, if anything, a softer casting than the sand pig, as I showed in the paper at your meeting at Cincinnati last October. Of course this illustration is the extreme of what may be expected in the carbons of pig iron, coming from one "cast." Nevertheless, pig irons of the same grade, cast in sand, from one or more "casts," vary widely in their carbons, due to the variations in the fluidity of the metal as it comes from a furnace, and its rate of cooling in the sand beds, also to differences in the size of the pigs. What is necessary is a knowledge of the silicon, sulphur, phosphorus and manganese contents of the pig metal. The different percentages of these four elements, as a rule, regulate grades in pig iron, where we are guided by analyses; and the carbon can be almost wholly combined or graphitic and still be ignored, as intimated above, in calculating foundry mixtures.

If it were true that the carbons could indicate the true grade of pig metal, then all claims of our inability to define correctly the grade of pig iron by its fracture, and of the great value of analyses in making mixtures of iron, are fallacies. Few realize the plight founding is in at the present day. Here we are educated, of late, to know that we cannot tell the grade of pig metal by its fracture, and that chemistry is our best guide to grade pig iron before it is remelted; still, for all this, there are those who through self-interest try to suppress chemistry, or regard with indifference restrictions and practices by which analysis would become a positive guide in making mixtures.

Mr. Sorge: Mr. West states that carbon can be ignored in the analysis of pig iron. He says further: "If it were true that the carbons could tell us the true grade of pig metal," etc. The claim has not been made that the condition of the carbon in the pig metal is a true guide to its character, but that the total amount of carbon in that metal will affect the character of the castings that are produced. In other words, the larger the amount, the greater the influence of the different metalloids on that carbon. Now if you omit carbon from the series of elements to be ascertained in pig iron, you are omitting the element which really makes pig iron and really makes cast iron; the fact being that carbon contained in iron produces the cast iron, while the various metalloids are simply the agents in influencing the condition of that carbon. And the amount of carbon actually contained in the iron is as important to know as it is to know the amount of these various metalloids or metals that influence its condition. As an illustration: In the manufacture of malleable castings it has formerly been held that the malleableizing of iron was due to decarbonization. The facts that have developed in the last few years have shown that this is a fallacy. And it has further been found by the manufacturers of malleable iron that very rich carbon irons are the very best irons to be employed in the manufacture of malleable castings. There are now some furnaces that are manufacturing iron, in which the total amount of carbon contained goes up as high as 4.3 per cent, which is something unusual in the way of ordinary pig metals. And this iron, a coke iron, by the way, is one of the very best metals that can be employed in the manufacture of malleable castings. This shows that the amount of carbon contained in the iron is as influential in the grading of iron, or in varying the quality of the iron for the purpose for which it is to be used, as the different amounts of these metalloids or metals to which Mr. West calls attention, for influencing the condition of this carbon in the iron.

Maj. McDowell: I think that Mr. West has got the thing confused. There is a difference between the value of pig metal and the value of the fracture to indicate what that iron is. There is no question that, if you are going to grade by the fracture the amount of carbon in the iron doesn't cut any figure at all, but when you come to buy the pig iron the amount of carbon does cut a good deal of a figure, because carbon is the life of iron. Malleable castings are to be made out of the very hottest metal that can be made, and carbon is what carries the life, and so we put the iron in the furnace to desiliconize it, and in doing so raise the heat. But if there isn't carbon there it won't carry it, and so it is that iron that has the largest amount of carbon in it is the most desirable for making malleable castings. It doesn't follow because that is so that that is going to show anything in the gradation of iron by fracture. It doesn't make a particle of difference whether the iron is cast in the sand or cast in the mold. It will affect the fracture, but it will not affect the chemical constituents of that iron.

Each of us has had his attention more or less attracted to the subject of the practical value of the metals and metalloids that combine with iron in making castings and also give the value of pig iron to the foundryman. Which of these elements has the most to do with determining the value of pig iron? Is it possible for the foundryman to formulate a specification by which he can order or contract for the metal that will meet his special requirements? As a general thing the furnaceman or his sales agent has his various brands, as Iroquois, Sterling Scotch, Peerless, Nos. 1 and 2 soft, silver and silver gray, and Nos. 1, 2, 3, 4 foundry, gray foundry, foundry forge, white forge, Bessemer and off-Bessemer, malleable pig and charcoal pig. Some of these names do designate a special purpose for which these metals are well adapted, but the majority of them have no significance to the foundryman. And what is No. 1 or 2 soft, or Nos. 1, 2 and 3 foundry to one furnace has no application to another. The names and numbers here have no significance except just to the sales agent who transposes them to suit his customer.

Is there not enough of homogeneity among the many foundrymen's associations to enable them to formulate a gradation of foundry pig by which they can contract for their metals? To illustrate, I have a tabulated statement, as follows:

No.	Kind of Iron.	Silicon.	Phos.	Mang	Sulphur.	Price per ton.
1	Foundry Pig.	2.75 to 3.00	.20 to .50	.40 to .80	.025 to .050	$11 75 to $12 00
2	" "	2.50 to 2.75	"	"	"	11.50 to 11.75
3	" "	2.25 to 2.50	"	"	"	11.25 to 11.50
4	" "	2.00 to 2.25	"	"	"	11.00 to 11.25
5	" "	1.75 to 2.00	"	"	"	10.75 to 11.00
6	" "	1.50 to 1.75	"	"	"	10.50 to 10.75
7	" "	1.25 to 1.50	"	"	"	10.25 to 10.50
8	" "	1.00 to 1.25	"	"	"	10.00 to 10.25
9	" "	.75 to 1.00	"	"	"	9.75 to 10.00

The price per ton is an assumption on my part. This table shows the variation only in the silicon, as it is this element that influences the value of metals. As each number varies 25 points in silicon, so does the price per ton vary 25 cents per ton, making each point of silicon worth one cent. As phosphorus and manganese are made to appear uniform, the former varying from .25 to .50 while the latter varies from .40 to .80, these variations are admissible and would not affect the price of the metal, but it would influence a preference, depending upon the special nature of the casting to be made. Sulphur is quite different and has nothing in it that is good at all in making castings for any kind, although I know of some

who advocate its use in making chills. In chilled iron it makes white iron, but there is no advantage in the chills. As one atom of sulphur is supposed to neutralize 10 of silicon, and if this is so then sulphur is an element to be considered in a scale of prices when the amount of silicon determines the value of the metal. How good this claim is that one atom of sulphur neutralizes 10 of silicon, I am not fully prepared to say, but I do know that when sulphur is above .05 and silicon running low in your castings the claim holds good, and as a precaution I would suggest when sulphur runs over .05 in the pig, say .075, it should make a difference in the value of the pig iron of 25 cents per ton. Say, for instance, it is No. 4 in my list, which in the table shows 2. to 2.25 silicon and .05 sulphur, and is worth $11 to $11.25, but if the sulphur runs as high as .075 it would be worth $10.75 to $11.

With these thoughts and suggestions, don't you think it worthy of our effort, the effort of this association; to inaugurate a proposition for the united action of all the foundrymen's associations, looking towards a more intelligent way of classifying or grading pig iron?

Mr. Sorge: I would like, in discussion of Maj. McDowell's paper, to call attention to the fact that he also makes the error of not paying sufficient attention to carbon contents of the iron. It is the most vital thing in the iron, the absolutely vital thing. Maj. McDowell made the statement that the carbon carried the heat. I think a little better explanation of that would be that the higher the carbon contents of an iron, the greater its fluidity; it doesn't carry the heat, but it will melt at a somewhat lower temperature than iron with a small amount of carbon in it, and therefore will hold its fluidity longer than an iron which is poor in carbon. Furthermore, in malleableization, the effect of high carbon seems to be an easy separation of the carbon from the iron during the process of annealing. The iron seems to be more easily annealed with high carbon than with low carbon contents. Now the effect of carbon of gray iron is known to all of us, that is, the higher amount of carbon the finer we can make our castings, into the finer grooves can we run that iron, the longer will it hold its heat, the fact being it is more fluid, and the iron is in every way a more valuable iron, except for special purposes, those in which we want to produce an iron having very small carbon contents. Therefore I think that the matter of the carbon contents of the iron should be given more careful consideration in the grading than the Major proposes here, and I think it is a subject that will be of great value to the foundrymen in general if taken up intelligently by the various foundrymen's associations of the country and by the furnacemen. If united action could be taken to establish a uniform grade which shall be standard and accepted by them it would be of vast benefit to the trade in general. I trust that the Western Foundrymen's Association, as usual, will take the first step in the direction of this advance for the foundry trade.

Maj. McDowell: My talk was simply to bring before the association the thought that I had, for I see wherever I go, a confused condition of things in regard to the selling of pig iron. A man calls upon me about his pig iron and talks to me about the graphitic carbon, and another one will talk about another thing. They call it No. 1 soft, and I don't understand what they mean by it. It does not convey any idea at all to me when he says, "This is Peerless," or, "this is something else." What the foundryman wants to know is, what is the iron? what is it made up of? and I simply have formulated this thing to bring out just what Mr. Sorge has suggested. I think it is high time that some association, and this has been rather the leading one in the country so far as ideas are concerned, ask that the foundrymen's associations go to work in formulating some gradation of pig iron that will give a more intelligent way, so far as the foundryman is concerned, of buying his metal. I haven't the slightest objection to including the furnacemen, but I think that they would rather be left out. The more confused it is between the foundrymen and them, the better it is, for they have the iron to sell; and I have often said that the less a man knows about iron the more he can sell. Still I wish some one would formulate some sort of a resolution that would put this thing in shape as Mr. Sorge has suggested.

Mr. Sorge: I would like to take issue with the Major on the question of leaving out the furnacemen. I don't think we want the pig iron salesmen in, but we do want the furnacemen; because when we have practical questions of melting, to produce iron of a certain grade, as shown by the paper presented by Major McDowell, the question will come up, whether they can produce iron that has these definite contents, or close to these definite contents of the various metals and metalloids. And in order to bring grading to a point where it shall be of practical utility we must furnish the furnaceman with specifications of what we want, of such a character that he can produce it. We must not furnish him with something that is going to give him an immense amount of trouble to produce, therefore he must be called in to advise on the subject of grading. And I would move that the Western Foundrymen's Association appoint a committee of three to communicate with the other foundrymen's associations of the United States and Canada, and to formulate a plan by which concerted action can be taken for grading pig iron in an intelligent manner, that shall be comprehensible to all furnacemen and to foundrymen.

Mr. Ferguson: I second that motion; yet it seems to me that it is asking a good deal not only of the foundrymen's associations, but of the furnacemen. I think the first step in that direction is for the foundrymen to educate themselves to know what they want before they ask the furnacemen to furnish them the iron. I don't think we would be any better off to-day if the furnacemen were in a position to furnish anything that is required. I don't believe the foundrymen of this country are able to dictate their requirements, and I think the thing first to do is to school the foundrymen to know the requirements, then ask the furnacemen to supply them.

Mr. Sorge: I made the motion in the shape in which I did with some object of that kind in view. The idea that I meant to convey was that the committee should be appointed to formulate if possible, a plan under which they could work. Now if that committee comes to the conclusion that such a plan can not be formulated in a practical way it is for them to report back to the association that that is their decision, and their reasons why they have come to that decision. We will then be able to determine what it is that is lacking in order to get the foundry trade in a condition in which foundrymen can say to the furnacemen, we want black or we want blue or we want gray. To-day we tell them, "I want something," and I think it is time we made a move in the direction of defining our position in that matter.

Mr. Ferguson: This discussion is leading on to just my idea of what it ought to be, schooling and educating as we go along. Maj. McDowell has stated to-night that the value of iron is based upon its silicon contents. I was just thinking that that doesn't match with the prices that have been submitted to me of late. Charcoal irons as a rule run low in silicon—below two per cent; to-day, even with the demoralized state of the charcoal market, it is higher in price than any of the coke irons. Then Mr. West in his statements wants us to ignore carbon in iron, and makes comparisons. These things are all in the direction of educating and schooling, and are preliminary and right. I don't agree with Mr. West. I think that we must look after the carbon in iron. I know of instances myself where the value of castings has been determined by the amount of combined carbon. You are there to watch it and gauge it and know its relative value, and you can't get along without watching the carbons as well as the other elements that are in the iron. And I still think that this paper on the value of the metalloids is just beginning to wake up the foundrymen. But I think it is a little premature to ask the furnacemen to supply us with something when we don't know what we want. Let the foundryman first know his requirements, then insist that the furnacemen shall supply them.

Maj. McDowell: There is no question about the condition of the foundrymen to-day. When a manufacturer of castings sends out a specification to furnacemen with a request that they furnish prices on pig iron, he will refer to castings of a certain grade, and the furnaceman has got to turn in and be a foundryman. Now that is all wrong. There are a few foundrymen to-day who make specifications of the kind of iron they want for their castings. They know what will make them, and they are very careful that they get what they contract for, too. It is a matter of course that it will take some time for the balance to get to this point, but there is no reason

why we shouldn't commence on this line. Now, I leave out carbon because carbon doesn't regulate the price of iron. It regulates the value in special cases. I say nothing about manganese or phosphorus; they regulate the value of a certain grade of pig metal to a man for special castings. It is a fact that to-day iron is bought and sold on account of its silicon contents, less the effect that the sulphur will have on it. I don't go back at all upon the value of carbon or manganese, or the value of phosphorus—all these for special purposes—but I am speaking about gradation of metal. We grade it, and silicon is the thing that regulates the value of pig metal to the foundryman because it will carry more or less scrap. Carbon gives heat and fluidity, there is no question about that; and you can add to fluidity by adding silicon to the iron. But when a man gives you a list of metals, the first thing you look at is silicon, and the sulphur next. Then the question is, where is your manganese; and if you are in a certain grade of castings, where is your phosphorus? All those things follow as a matter of course; it depends altogether upon what the castings are. A man will give the preference to the pig iron that has that element in it that he specially wants, but the value of the pig metal is entirely regulated by the amount of silicon in it, and that is a good standard. There isn't anything that will so educate the foundrymen as to have them work over that proposition; and I think some foundrymen could afford to spend some money in that direction to know what sort of pig metal they want for their castings. I would like to see a unanimous vote of this association that we have this committee.

Mr. Sorge: Maj. McDowell starts out on the basis that the value of pig iron to-day is determined by its silicon contents, and therefore we should make our gradation of iron by the silicon contents. Now I claim that anything that affects the iron for the purposes of the foundryman should be taken into consideration in making up the grade. The carrying of scrap is an exceedingly valuable element in a pig iron purchase. There are other elements that enter into it, as Maj. McDowell admits; but he brushes them aside as being simply for special purposes, and are not necessarily to be considered in the general grading of the pig iron. I claim that in the general grading of the pig iron the total characteristics of that iron as developed by its analysis ought to be considered. Take the case of the modern charcoal furnaces that are being built, 20 to 30 feet higher than the old furnaces, with one principal purpose in view, and that is to raise the carbon contents of the iron, for the irons richer in carbon are worth quite a little more money than the poor carbon irons and will continue to be.

Mr. Ferguson: This last week I looked over the analyses of probably 50 different brands of pig iron, our firm contemplated purchasing, and I think in that assortment a man could pick out anything that he wanted, as long as he knew what he wanted; it is there, it is on the market. I don't know how they could get it different from what they do grade it, but you can get any kind of iron that your requirements call for. And I don't see myself how they can be called upon to supply something to fill the requirements of everybody when they don't know what those requirements are. I think the thing to do first of all is to school men and educate them to know the requirements.

Mr. Sorge: I think that perhaps Mr. Ferguson is a little bit misled by not considering that to-day the grading of iron of course is by fracture. Bear that in mind, that the idea is to get rid of that grading, which we consider unreliable, and to substitute for that a grading which shall give certain standards to which the furnacemen and the foundrymen can refer in attempting to make purchases of iron. To-day, if you go to purchase a No. 2 soft iron, you may get one thing from one man and another thing from another man. Now the idea is to so define what a No. 2 iron shall be, that it shall convey a distinct and definite idea to any man who purchases it. That is as I understand the whole sum and substance of this committee's work, and to obtain such a standard to be adopted by the various foundrymen's associations, and then to be adopted by the furnacemen as being considered practical, as giving grades that they can distinctly recognize and can manufacture. To-day we haven't a grade that can be distinctly recognized by two individuals as the same thing.

Mr. Ferguson: That would be a happy state of affairs if we could ever get it. I believe the thing is working that way itself, and I believe it will continue to work out that way if it is left just as it is. The fact is that there are many furnaces now that will give you a guaranteed analysis of their iron right along, and those that are looking for iron with a guaranteed analysis will patronize those furnaces that are willing to furnish it, and that will bring other furnaces into line and they will analyze their iron and sell it by analysis instead of by fracture. One man's requirements are different from another man's requirements, or he thinks they are, anyway; what suits one won't suit another.

Maj. McDowell: Every furnaceman has a name and number for his pig metal, that don't correspond with any other furnace at all, and as long as that is so it is unsatisfactory. Why not have all the furnacemen agree upon what shall be No. 1 and what shall be No. 2? We will say, for instance, the base price from this table that I have given here is No. 5, on each side of it are so many numbers; No. 5 is two per cent silicon. Now the foundryman says the pig iron to-day is worth $10; he means that base and all the others grade up from it just 25 cents.

Motion put and carried.

The chair appointed on the committee, Maj. McDowell, William Ferguson and O. T. Stantial.

On motion, the meeting adjourned.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The Francis & Mygren Foundry Co. has been incorporated at Chicago, with a capital stock of $10,000, by Robert N. Holt, J. K. Lambert and Chas. S. Welliston.

The William Ferguson Co. has been incorporated at Chicago, with a capital stock of $25,000, by William Ferguson, Paul W. Lange and Fred. B. Vogel. Will operate a foundry.

The Cook Rotary Engine Co., Superior, Wis., has been incorporated with $75,000 capital stock.

Wendell Ruof, Knoxville, Tenn., wants bids on a good second-hand engine-valve seating milling machine.

The Southern Iron & Steel Works, Birmingham, Ala., will buy a second-hand punch and shear.

Hoisting and haulage machinery is being figured on by the Paducah (Ky.) Coal & Mining Co.

Bids are asked until April 6 for furnishing the Cincinnati water department with machine shop castings in loam and green sand, furnaces, plain grate bars, special grate bars and fire liners, street valve castings and boxes; also iron pipe and pipe specials, brass castings and brass ferrules.

The Dora Foundry, Car Wheel & Machine Co., Pulaski, Va., wants a second-hand locomotive, standard gauge, for mine purposes, and also a second-hand locomotive, 3 feet 8 inches gauge, seven or nine tons, for mine purposes.

The Osborn Machinery Co., Clarksburg, W. Va., is in the market for a seven-horse-power gas engine.

A company has been formed at Greensburg, Pa., to establish a foundry to manufacture castings for coal mines. It is composed of Col. L. B. Huff, Richard Coulter, Jr., J. Howard Patton, Harry Burkem, and J. R. Eisman. The capital stock is $15,000. The company has taken the foundry establishment of Wm. Truxell.

The Aurora Boiler Works have been incorporated at Aurora, Ill., with a capital stock of $25,000, to manufacture boilers. The incorporators are J. W. Battle, John Kelley and B. B. Scott.

New Construction:—

A Hagerstown, Md., report says that the Western Maryland road is negotiating for a site there, on which to build shops.

The new car repair shops of the Eastern Railway of Minnesota at Superior, Wis., are nearly ready for occupancy. The new building is 300 x 100 feet and cost $50,000.

Bids are being received this week on the new foundry of the General Electric Co., at Schenectady, N. Y. It will be 500 feet by 140 feet. The expectation is that it will be completed in early August. With recent additions the force at Schenectady now numbers 3,700 in shops, or nearly 4,200 adding tech-

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nical and office forces, close to the largest number ever employed.

C. P. Huntington has given orders to begin work on the great dry dock of the Newport News Shipbuilding & Dry Dock Co., at Newport News, Va. The dock will be 900 feet long and 90 feet wide, and capable of receiving two battleships at one time.

Estimates are being taken on the large steel plant to be erected at Birdsboro, Pa., for the Schuylkill Valley Steel Co., of 102 Walnut st., Philadelphia.

The Inland Steel Co., Chicago Heights, Ill., have purchased two 400 h. p. engines from the J. H. Bass Foundry Co., of Fort Wayne, to be installed in the new plant now building.

C. E. Doughty has sold his interest in the Norfolk (Neb.) Foundry & Mfg. Co. to E. A. Bullock, and the partnership heretofore existing between them has been dissolved.

The Fulton Steam Boiler Works of John T. Caulfield, Richmond, Ind., have gone into the hands of a receiver.

Additions, Enlargements, Removals, Etc.:—

Contracts have been let by the Carpenter Steel Co., Reading, Pa., for three additional buildings, to enable the company to turn out Government work. The largest is 60 x 125 feet and will be an addition to the present crucible department.

The Berger Mfg. Co., Canton, O., is expecting to make Rock Island its Western distributing point, instead of Chicago, if arrangements can be made for a building and site. A building 150 x 80 feet is desired.

The Louisville & Nashville Railroad Co. contemplates the removal of its car shops at Bowling Green and Memphis to Clarksville, Tenn.

The Q. & C. Co., manufacturer of railway supplies, Chicago Heights, Ill., has begun construction on a two-story factory to adjoin the present factory building on the east. As soon as the building is completed there will be a large amount of high grade machinery installed and the force increased from 125 to 175 men.

The Stover Mfg. Co., Freeport, Ill., has been compelled to enlarge its facilities. The business has nearly doubled the past year. The company will enlarge its foundry 50 per cent. and add more storage room.

Fires and Accidents:—

Fire in the Turner brass works, Chicago, caused $3,000 loss; insured.

At Greenville, Pa., fire in the foundry and machine shop of A. T. & W. A. Kreps did $7,000 damage; insurance, $4,000.

Fire in the Edgar foundry at Mobile, Ala., March 14, caused a loss of $5,000. The insurance was $4,000.

General Industrial Notes:—

Car and locomotive work: It is stated that a large car order will be given to the Haskell & Barker Car Co. by the Great Northern. The Union Pacific is said to be planning to place 5,000 more cars. The C. & O. is asking bids on 300 to 700 cars. The D. L. & W. is expected to buy 300 to 500 new freight cars. For the Louisville & Nashville, 600 gondolas and 100 furniture cars will soon be bought. The Northern Pacific will buy or build 300 flat cars. The Ohio Falls Car Mf.g Co. is building 200 coal cars for the Chicago & Southeastern. The Illinois Central, it is rumored, will order 50 to 60 locomotives. The Schenectady Locomotive Works have an order for 12 locomotives for the Kiushiu Railway of Japan. The Chicago, Rock Island & Pacific will buy some new locomotives. The Iowa Central is said to be figuring for six and the Ohio Central is figuring.

The export business of the Davis & Egan Machine Tool Co., of Cincinnati, is steadily increasing. In the past week the company has received through its office at London, Eng., an order from C. & D. Peteres & Co. at Moorgate, Eng., for a

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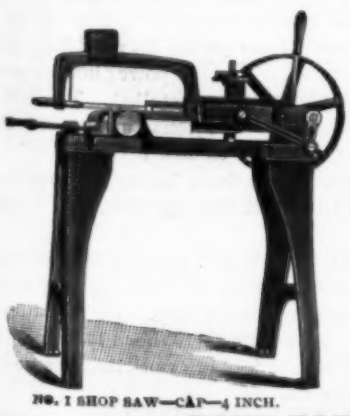

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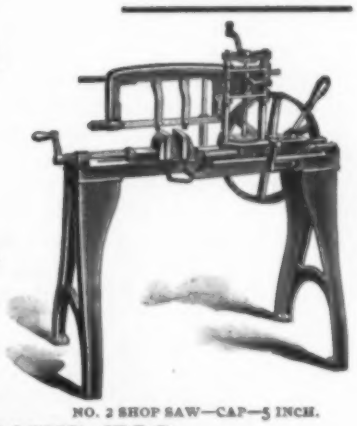

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MONTREAL, J. G. Sibbald, 3 Windsor Hotel.
SAN FRANCISCO, John Woodlock, 26 Beale St.

number of heavy screw machines and milling machines; also a large re-order from Fraser & Chalmers, Ltd., Erith, Eng., for engine lathes, chucking lathes, boring mills, and radial drills. Through its office at Berlin, Germany, the company received an order from the Nach-Maschinen & Fahrrad Fabrik (Vorm. Bernh. Stower), at Stettin, for bicycle machinery, including screw machines, hub machines, pedal machines, and sprocket milling machines. Domestic orders also are coming in more freely.

The Baldwin Locomotive Works have a contract for 15 locomotives for the Egyptian State Railway.

The Illinois Steel Co. is contemplating a number of improvements at its Bay View, Wis., works, and it is understood that work upon them will begin soon. The cast-house of the blast furnaces is to be enlarged one-half. The wooden machine shop is to be replaced by a brick structure, and the merchant mill warehouses are to be moved to one end of the mill so as to facilitate the handling of iron.

It is thought the long idle car works at Muskegon, Mich., will be bought by a new company, which will be organized at Chicago.

The Tudor Iron Works, East St. Louis, have completed the installation of 500 incandescent and 30 arc lights.

The puddle mill of Samuel R. Seyfert & Bro., at Seyfert Station, Berks Co., Pa., started up again, the men accepting the reduction to $2.25 a ton.

The Winchester Repeating Arms Co., New Haven, Conn., is reported to be at work upon an order of 10,000 rifles for the United States Navy.

The Tennessee Coal, Iron & Railroad Co. is repairing the No. 2 furnace at South Pittsburg, Tenn., preparatory to putting it in blast.

The molders at the Canton (O.) Plow Works have gone on a strike for the restoration of the 20 per cent taken from their wages in 1896. The company says all contracts are based on the lower wages and the advance cannot be made now.

The Chateaugay Iron Co. is arranging to resume operations at its iron mines at Lyon's Mountain and Standish, N. Y., some sales having been made to Pennsylvania steel companies.

The James Gregory Co., brass founders and metal workers, 106-110 Cannon st., New York, has assigned. The capital is $30,000.

A Birmingham, Ala., special says that a deal has been practically closed for the sale of the furnace properties of the Sheffield Coal & Iron Co., at Sheffield; the Philadelphia Furnace at Florence; the Withrow Furnace at Sheffield, and the mine properties of the Lady Ensley Coal & Iron Co. along the line of the North Alabama Railroad, to an English syndicate, for something like a million dollars. J. W. Harrison, president of the Howard-Harrison Iron Co., of St. Louis, and F. B. Nichols, also of that city, are said to be largely interested in the transactions.

Employes of the New Castle, Pa., tube works struck for the re-instatement of a workman who was discharged for refusing to work overtime on Saturday.

The Q. & C. Co. has accepted the Western agency of the Pennsylvania Steel Co., with headquarters at their general offices, Western Union Building, Chicago.

Belts that slip not only do not drive properly, but they wear out rapidly. A belt that is too tight is overstrained, and will also wear out rapidly. A thoroughly reliable belt dressing is therefore a necessity. As long ago as 1878 Dixon's belt dressing and leather preservative was used on the big driving belt at the Paris Exposition, when other means had failed to make the belt take hold of the pulley that was to start the thousands of feet of shafting and hundreds of machines. It is made only by the Joseph Dixon Crucible Co., Jersey City, N. J.

At Granada, Minn., Walter Page has started a machine shop.

The Ft. Madison (Ia.) Iron Works Co. has increased its capital from $100,000 to $200,000.

The heavy business so far this year, showing an increase of something like 40 per cent over business for the corresponding period in 1897, has made it imperative for the Sargent Co., of Chicago, to increase considerably its capacity. It has recently installed a large 20-ton electric traveling crane from Manning, Maxwell & Moore, in addition to the cranes now operated, and an additional saw of improved type manufactured by the Q. & C. Co., and is rearranging its receiving and shipping departments extensively. In the power house, new engines, dynamos, etc., are about to be installed. The company now has a capacity of about 1,000 tons a month, which will be greatly increased by the changes now making.

Wm. Hannabaum & Frank Didion have leased the foundry and machine shop of Peter Didion at Billings, Mo., and it will soon start up.

The Marinette works at Duluth, Minn., will not be operated by D. C. Prescott after the completion of pending city contracts for engines and pumping machinery. W. F. Bailey, proprietor of brass works, is considering the addition of a foundry to his plant to take care of jobbing work that has gone to the Marinette plant heretofore.

The Pennsylvania Steel Co. is reported to have received

U. BAIRD MACHINERY CO.,

123-125 Water St., **PITTSBURG, PA.,** 124-126 First Ave.

Machine Tools and Supplies. Send for list of Second-hand Tools.

THE ANDREW PATENT GRIP SOCKET.

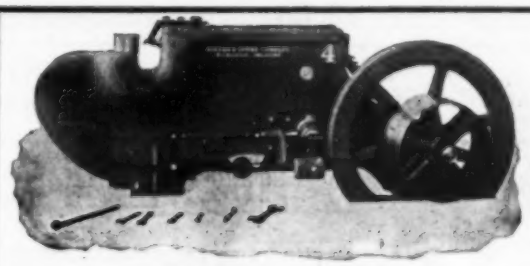
Holds straight or taper shank drills perfectly rigid. Protects the Shank until the drill is completely worn out. Old taper Shank drills with tangs broken off used just as well as new drills. Beware of infringements.

M. L. ANDREW & CO.,
60-62 Elm St., Cincinnati, O.

A firm needing a certain line of goods naturally turns first to those it has seen oftenest advertised, and with whose name it thus has become familiar. "Keeping everlastingly at it brings success."

Persistence In Advertising

Is one of the requisites of satisfactory results. In the expansion of business which is now noticeable in every section of the country, advertisers who have made themselves regularly prominent in the past two years will be first to reap the rewards of persistent publicity.



NO. 4 HORIZONTAL PUNCH.

The illustration shows an improved horizontal punch designed for heavy work. The die is held in a forged steel stake which is keyed solidly through the nose. Small diameters and irregular pieces are very easily handled on this machine.

HILLES & JONES COMPANY,
908 Church Street,
WILMINGTON, DELAWARE.

Send for new CATALOGUE.

PUNCHES AND SHEARS

OF ALL KINDS

MANUFACTURED BY

The Long & Allstatter Co.,

HAMILTON, OHIO.

Send for catalogue.

When you write to firms advertised in our columns, please mention the fact that you took their address from our paper. They will thank you for it.

orders for rails for Australia and for a street car line in Los Angeles. The entire plant at Steelton is in operation, with over 600 more men than at this time in 1897.

The Betts Machine Co., Wilmington, Del., is running day and night on machinery for use at the navy yards.

The Sheridan Furnaces, near Reading, Pa., will blow in soon. The new company will be the Sheridan Iron Co., Ltd. One furnace will start May 1, with John P. Kennedy as manager.

At the annual meeting of the Harrisburg Foundry & Machine Works this week, action will be taken on an increase of from $150,000 to $200,000 in capital stock, and the complete rebuilding and equipment of the plant.

The Cambria Iron Co. has declared a dividend of two per cent, payable April 1.

A charter was granted last week to the Lawrence Limestone Co., New Castle, Lawrence County, Pa.; capital, $1,200. Directors, John Reis, W. K. Johnson, Charles H. Johnson, George W. Johnson, New Castle; W. C. Kirkland, Beaver.

A motion for permission to enter a disclaimer in the patent right suit against the Cambria Iron Co. by the Carnegie Steel Co., was argued in the United States Circuit Court in Pittsburg last week. The suit involves the right to a patent mixer and process of mixing molten metals, claimed by the Carnegie company.

Stanley G. Flagg & Co., Philadelphia, in order to meet the demand for their steel castings, are running their castings department double turn.

The armor plate department of the Homestead works of the Carnegie Steel Co., Ltd., will resume within a few weeks, starting on the contract recently secured from the Russian Government. It is probable that following this, some of the armor plate for the Illinois, Alabama and Wisconsin, unfinished warships, will be given to these works.

The Tennessee Coal, Iron & Railroad Co. closed out nearly all of its accumulated stocks of iron in 1897. Though prices of iron were low, the company earned its interest, besides reducing its floating debt and cutting down its bonded debt $68,000. The floating debt statement shows a decrease of $474,986.07, but floating assets decreased $430,144.24. There are outstanding $8,519,000 of 6 per cent bonds and $1,129,000 of 7 per cent bonds. The fixed charges are $59,579 a month. The interest payments chargeable against the last fiscal year amount to $649,830.10.

At Allentown, Pa., Emma Audenreed, of Philadelphia, entered an execution March 15 on a mortgage against the Macungie Iron Co. for $17,000, to sell the company's property of 54 acres and furnaces, near Macungie, April 8.

The Geiser Mfg. Co., of Waynesboro, Pa., manufacturer of agricultural implements, has closed a contract with the Chicago Heights Land Association for the location of its Western works at Chicago Heights. The plant will be located on blocks 105 and 106, having a frontage of 900 feet on 17th st., and containing about 12 acres of land. The company will begin at once the erection of two factory buildings 80 x 450, with truss roofs the entire length of the buildings, and an office building 60 x 80, two stories high. In addition to this they will have a boiler and engine-house and several other buildings which will be used for storage and warehouse purposes. All buildings will be of brick, stone, and steel con-

INLAND IRON & FORGE CO.,

Marquette Building, CHICAGO, Manufacturers of

BAR IRON AND STEEL,

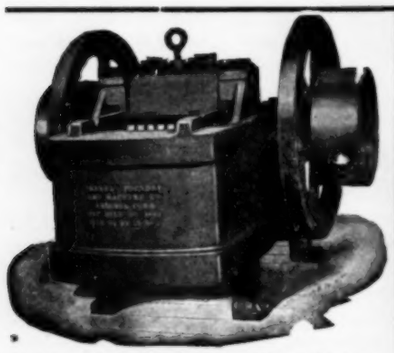
Angles, Channels and Special Shapes for Car, Carriage and Wagon Work.

Iron and Steel Car Axles and Forgings.

Works, EAST CHICAGO, IND.

(Formerly owned by East Chicago Iron & Steel Co.)

IT PAYS to advertise in The Iron Trade Review.



THE FARREL (Blake Pattern, Ore and Rock) ---CRUSHER.

STANDARD OF THE WORLD.

Farrel Foundry and Machine Co.,

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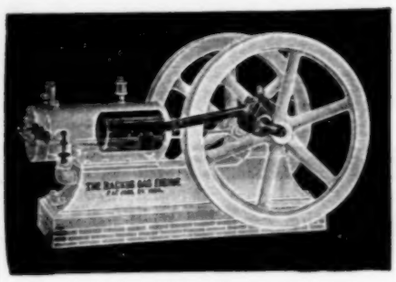
Backus Gas and Gasoline Engines.



FOR SALE BY

BAIR & GAZZAM MFG. CO.,

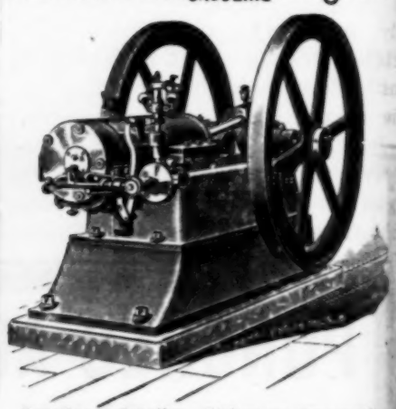
Pittsburg, Pa.

HOME OFFICE:

BACKUS WATER MOTOR CO.,

Newark, N. J.

The Brown GAS AND GASOLINE Engine.



Uses Gas or Gasoline. Makes no compression while engine is running idle. Charges fired with electric spark tube igniter. Made upon honor and fully guaranteed. Write for description and prices.

Columbus Machine Co.,

COLUMBUS, O.

struction. The company will give employment to about 300 men. The officers of the company are: A. E. Price, president; A. D. Morganthall, vice-president; J. J. Oller, treasurer; J. A. Middower, secretary, and George B. Weaver, general purchasing agent.

The earnings of the Tennessee Coal, Iron & Railroad Co. last year were $623,825. The payment of interest chargeable against the fiscal year amounts to $649,830, as compared with $660,085 paid out in the previous year. Interest payments will be reduced in 1898 not less than $50,000, as the result of the heavy sales of pig iron and the consequent liquidation of loans carried on the iron. Over $54,000 has been charged to operating expenses which has been expended for improvements and betterments. The general balance sheet, as of Dec. 31, 1897, shows total assets of $32,202,666, a decrease of $304,194. The statement of the floating debt and available assets Dec. 31, 1897, compared with the previous year, shows surplus assets over floating debt of $224,227, an increase of $44,842.

W. A. Jones, of the W. A. Jones Foundry & Machine Co., Chicago, reports that the business of his company has increased so largely that it has become necessary for him to consider an increase in the size of his plant. Two plans are under consideration. One involves an addition to the present plant at 53 to 59 South Jefferson st., and the other the erection of an entirely new plant to be run in connection with the present one. If the latter plan is finally decided upon the new plant will be built on property now owned by Mr. Jones at the corner of Rockwell and Flournoy sts., in Chicago.

The Standard Mfg. Co., of Pittsburg, manufacturer of bath tubs and plumbers' supplies, has established four foreign agencies of late—one in Paris, two in Japan, at Yokohama and Kobe, and a fourth at Zurich, Switzerland.

Work of Boiler Inspectors.

The following table gives a comparison of the work of the inspectors of the Hartford Steam Boiler Inspection & Insurance Co. in 1896 and 1897:

	1896	1897
Visits of inspection made	102,911	105,062
Whole number of boilers inspected	205,957	206,657
Complete internal inspections	78,118	76,770
Boilers tested by hydrostatic pressure	8,187	7,870
Total number of defects discovered	143,217	131,192
" " of dangerous defects	12,988	11,775
" " of boilers condemned	663	588

We are in receipt of the bound volume of the *Locomotive*, the publication of the above-named company for the year 1897. It contains articles of value relating to boiler construction and operation. A feature is a statement of boiler explosions, month by month, with causes, as far as ascertainable.

Three Leading Pig Iron Producers.

The pig iron production of the United States, England and Germany for 1896 and 1897 is thus tabulated, the production in Great Britain for 1897 being estimated in part:

	1896, tons.	1897, tons.
United States	8,623,137	9,652,680
United Kingdom	8,563,209	8,789,455
Germany	6,360,982	6,889,067
Totals	23,547,328	25,331,202

Stahl und Eisen reports the pig iron production in Germany for January to be 626,871 tons, as compared with 564,364 tons in January, 1897.

FIRE did $2,000 damage to the plant of the W. Dewees Wood Co., at McKeesport, last week.